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(Horseshoe, Poppy, Green Marigold.)

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[illegible]

Personnel: 1000

1. Postharrow, with good moor,

30 Flowers, Lemn. grass, Phlox  
 31 Flowers, Lemn. grass, Phlox

Close together and rolled out.

Western Bank

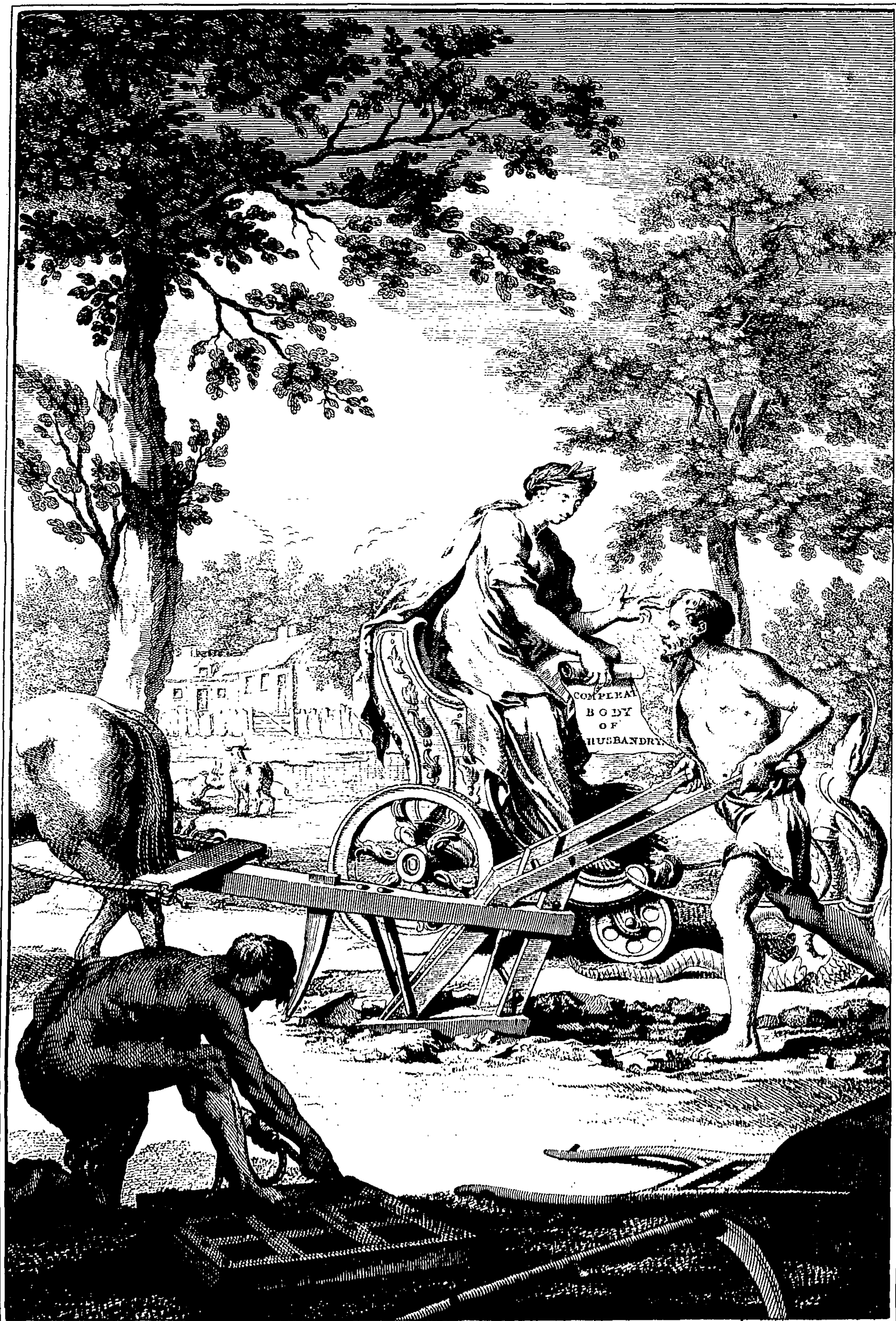
Monday, 11th March, (Leaving Nightshade,)

Mr. Dreyer, 209 Broadway, White 1801.

26 Christopher, Walter, Robert, Margaret, John

*mon. Vespertilio, Fort. Smith's Exped. pp. 90. 2nd ed. 1871.*





*The Goddess CERES in her Chariot drawn by Dragons, teaching MAN the Art of Husbandry.*



A  
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O F  
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And S. C R O W D E R and H. W O O D G A T E in Pater-Noſter Row.

. M. DCC. LVI.



# The P R E F A C E,

CONTAINING

The Plan of the WORK as published by the Proprietors with the first Numbers.

THE Occasion of this Work arose from certain *Materials*, very considerable in *Quantity*, and, as we were informed, much more in *Value*; which came into our Hands by Purchase. They were collected by a Gentleman lately deceased, whose Name we are now authorised to mention; and were intended by him for the *Press*. They contain, as he observes, in an Introduction prefixed to them, what he had found of Value relating to the Subject in *Authors*, what he had learnt by Conversing with the most intelligent *Farmers*; and all he had discovered by an active Experience of more than thirty Years.

The Account we received of these *Papers* from some undoubted Judges into whose Hands we first put them, confirmed us in the Opinion that they might be serviceable to the Publick, as well as advantageous to ourselves. The Methods we have taken to improve, illustrate, and compleat the Plan, the Publick have seen; and we hope they have appeared to them as proper, as they seem to us to have been successful.

In Consequence of our Advertisements, we received many Additions in the different Branches; and were offered the Assistance of several Persons of Knowledge and Experience in the Subject, to methodize and put the finishing Hand to every Part.

Being determined to spare no Expence or Pains, toward the rendering so useful an Undertaking as compleat as possible, we purchased every Paper of Value brought to us; and engaged so many of the Hands offered to our Assistance, that every separate Branch fell under the Care of a distinct Person, who was a Master of that Subject.

It is now our Duty to thank those Gentlemen from whom we have received Observations relating to the Subject in the Counties where they live, and whose Names with their Permission we have inserted in the Title.

The first Thing that appeared upon the Perusal of these Papers, was the great Insufficiency of all other Books written on this Subject: and the Want of such a Work as the Materials they contained might supply, was not less evident.

The Authors who have written on Husbandry have all failed, either in Matter, or in Manner. They have not been able to instruct the Farmer; or have not been Masters of Expression to convey their Knowledge. They have either treated superficially what they only pretended to understand; or have buried their Experience under such a Load of needless and ill chosen Words, that it has been found very difficult to understand them.

As we were assured there was sufficient Knowledge contained in our Materials, we desired the Style might be plain and clear; intelligible to the Farmer, and not below the Gentleman: so that every Part might be acceptable to every Reader.

After this Care that the present Work might be understood by all Persons, we made Provision that they should also in other Respects understand one another. Till this Time a Discourse on the Subject of Husbandry between the Landlord and his Tenant, was generally unintelligible to both: nor did the Farmer of one County understand the Language of him who lived in another. The most useful Writings have also lost their Effect from the same Cause. This was an old and general Complaint; but no Remedy had been hitherto applied.

The Misfortune arises solely from the employing Terms in the Art, and Names of Things, used and understood only in particular Places, or only by the

working People. To prevent this, not only all the Terms used in the present Treatise are clearly explained; but those also which have been employed by others: So that Husbandry will, we hope, be hereafter as generally understood, as it is universally useful.

Having thus explained the Manner in which our Plan has been executed; it will be proper to lay before the Publick a short View of what it contains.

We have used, as before observed, all Endeavours to compleat the Original Author's Design: and an Undertaking so extensive, we are sensible less than the Assistance of numerous Communications, and the Labours of many Persons, could never have accomplished.

Agriculture is here traced from its small and simple Original; followed through the several Ages, and examined in the Practice of the different Nations, wherein it has been improved down to the present Time. From the Harvest of the old Romans, it is pursued through the Vineyards of the modern Italy: nor are the late Improvements in France, or the useful Labours of the Swede or Russian omitted. The Practice of one Country differs from that of others; yet they may learn one from another. Where the same Means have been used in different Places, and a different Event has followed; the Attempt has been to find the Cause of the Success or Failure: that the Truth might be rendered apparent even from Contrariety.

Some Rules the Author has indeed collected from Books; but they appear little either in Quantity or Use, when compared with what he has delivered from his own, and others Experience. Having considered the whole Compass of Husbandry, he takes it all for his Subject; comparing what he had read with what he had seen, and confirming or rejecting Theory by Practice.

The Gentlemen whose Assistance we have procured, have followed the same Plan; collecting from Authors whatever of Value he had omitted; and having thus inserted in the Work a Summary of all that has been written on Husbandry, they have added the much more important and much larger Part, all that has been discovered by modern Practice. Where Authors and Experience disagree, they take Experience for their Guide; and where the Practice of one County, seems to contradict what has been advanced upon the Customs of another, the Determination is made on the Result of a careful Comparison.

In this Work the least Things are regarded with Attention, for the greatest Events frequently depend on them. Nothing is asserted but upon Experience or Proof. The old Practice of Husbandry is condemned or established by the new. Easy and familiar Things are delivered first; and from them, gradual Advances are made to the more difficult. The Farmer will be thus led by the Hand, through his whole Business; and the Landlord will be instructed with him. The latter will be able to know in all Circumstances, whether the other conduct himself right; and the Tenant cannot remain ignorant unless by his own Fault.

By these Means we hope the Advantages of our Work will be as extensive as the Plan. The Information of the Farmer is the enriching of the Landlord: and the great Endeavour of our Undertaking is Instruction; as the sole End proposed from it is Use.

As the Compass of our Undertaking is so large; and the Heads it comprehends are so very numerous, we are sensible that a great deal of the Plainness and Pro-



*Propriety* of the Work, must depend upon *their* proper *Arrangement*.

In the Intent therefore of leading the *practical Husbandman* through the several *Branches* of his *Profession*, he shall be introduced to the *Seat* of his *Industry*, (whether his own or rented) and the Work begun with *that Article* which is to come first under his Consideration, the *Soil*.

This shall be treated of under its several natural Distinctions, whether it be *Clay*, *Loam*, *Sand*, *Gravel*, *Chalk*, or *Mellow Earth*, considering, if *Clay*, to which of the *four principal Kinds* it belongs; and in what Manner it may be *meliorated*: as also whether *Pits* may be opened for the *Pottery*, or *Brick* and *Tile-making*; for the *Brewery*; or *burning* for the Service of *other Lands*.

When we have in the same Manner, gone through the other five Kinds of Soil in Respect to their *Improvement* for Culture, and their *various Uses*; we examine for what Purposes they are best suited, from their *Situation*, as well as *natural Qualities*: Which will be fittest for *Arable*, which for *Pasture*: whether in any Part *Marle* may be found at a *Depth*; or *Peat* near the Surface: in what Places *Art* may turn to Advantage the Imperfections of *Nature*: How the *Fenn* may furnish a *Decoy*; and *Pits* may be converted into *Fish Ponds*.

From the Consideration of the *Soil*, we shall rise to that of the *Manures*; the numerous Kinds of which will be described; their Properties explained; and the particular Species pointed out, for different Services.

From these we shall enter on the Nature of the *Fences* in our several Counties; and treat at large of *Ditching*, *Draining*, *Hedging*, and *Planting*; of the Profits arising from *Coppice Wood*; and of the *Timber Trees* fit for several *Soils*, *Exposures* and *Situations*: of the *Oak*, *Ash*, *Elm*, *Beech*, *Maple*, *Walnut*, *Pear Tree*, &c. Under the Article *Oak* will be delivered the several Methods of *sowing* the *Acorn*, and raising the *Tree* to its full *Strength* and *Value*; Rules for judging of the *Timber*, and the Ways of *seasoning* it for lasting: giving the *Preference* under each Head, according to *Experience*. In the same Manner the rest also will be considered.

After *planting* will be delivered the best Methods of *stocking* the Farm, under the Heads of the *Field*, *Yard* and *Stable*. And here will be introduced the Management and Advantages of the *Cow*, *Sheep*, *Horse*, *Hog* and *Poultry*. On each of these Heads a great Number of Rules will be laid down, founded on successful *Practice*; and respecting their *Breed*, their *Value* at their several *Ages*, their *Feeding*, and entire *Management*.

When the Farm is thus *prepared*, *planted* and *stock'd*, we shall advance to what more immediately bears the Name of *Husbandry*. This will be considered as *general*, or *particular*. The several Kinds, respecting particular Articles, and distinguished by the Names of *Drill Husbandry*, and *Horse-hoeing Husbandry*, will be *explain'd*; and their *Advantages* and *Defects* shewn from the Result of frequent *Trials*.

The *Practice* of the Farmers in *different Counties* will be then *laid down*; and from the whole the careful Husbandman will be fully informed with regard to *Plowing*, *Sowing*, *Harrowing*, *Rolling*, *Hoeing*, *Pulling*, *Cutting* and *Carrying*.

From these *general Instructions*, he will be led to the Consideration of the several *Kinds of Seeds*: Under which Head he will be made acquainted with the *Nature*, *Properties*, and *Preparations* of *Wheat*, *Barley*, *Rye*, *Oats*, *Beans*, *Peas*, *Tares* and *Lentils*.

From these he will be led to the Knowledge and Culture of the several Kinds of *Grass*; to be sown either singly, or with his Corn. Here he will be in-

structed in the Nature, Value and Qualities of *Common Grass*, *Clover*, *Saint Foyne*, *Lucerne*, and the like.

After which will be shewn at large the Culture and Uses of such *Roots* as may be advantageously planted in *Fields*; as the *Turnep*, *Potatoe* and *Carrot*.

From *these*, the Subject will naturally bring him to such Articles as, tho' less *universal*, are not less *advantageous*. Among these will be particularly delivered the *Culture*, *Management* and *Profits* of *Hops*, *Flax*, *Hemp*, *Woad*, *Weld*, *Coleseed*, *Liquorice* and *Saffron*, with Instructions concerning *Madder*, and some others, which tho' not cultivated at this Time in *England*, might be introduced with great Advantage.

From the immediate *Subjects* of his *Profession*, he will be brought to the Consideration of their *natural* and *artificial Products*; and among these particular Regard will be had to the *Use* and *Management* of *Milk*, *Cream*, *Butter*, *Cheese*, *Wool* and *Leather*.

The Accidents to which his *Cattle* or his *Crops* are liable, will after this be laid down; and the *Diseases* to which they are *subject*; with the most approved Methods of *preventing* or *remedying* each.

Under the first Head will be shewn the Effects of *Drought*, *Rains*, *Hail*, *Snows*, *Winds* and *Blights*; at what Times they are to be *expected*; and by what Means the several Objects of Husbandry may be most effectually *secured* against, or best *preserved* from them.

The other Head of Enquiry will lead to the *Diseases* and *Distemperatures* of his *Cattle*, *Corn* and *Trees*. Under the first Article will be considered the *Murrain*, the *Rot*, the *particular Distemper* now raging among the *horned Cattle*, and their being poisoned by unwholesome *Herbs*, *Insects*, or *Waters*.

The *Causes* as well as *Symptoms* of these several Disorders will be explained from repeated *Observations*, and the *Concurrence* of *Authors* and *Experience*: and the best *known Remedies* for each will be *set down*.

The *Distemperatures* of *Vegetables* will be arrang'd under three Heads, as they affect *Trees*, or *Roots*, *Corn*, and other *Herbage*. And in the Enquiry into their *Cause* and *Origin*, will be considered at large the Mischiefs occasioned by *Insects*, as the *Fly*, *Slug*, *Worm*, *Grub*, *Caterpillar* and *Locust*; and every Method will be *inserted* which *Experience* warrants, or *Reason* recommends to the Trial, for their *Destruction*, or the *Preservation* of the Crop.

To these will be subjoin'd the Mischiefs to which *Corn* and other *valuable Growths* are subject from *Weeds* and *Birds*, and the *easiest* and most *certain* Methods will be delivered for the *Extirpation* of the one, and for *Preservation* from the other.

From the ample, distinct, and plain Manner in which *these* and a Number of *other subordinate Articles* will be treated in the Course of this *useful Work*, we persuade ourselves the Farmer will be fully instructed how he is to conduct himself in the *Field*, the *House*, the *Dairy*, the *Stable*, and in *Maying* and *Harvest-Work*; and that in such a Manner as to procure all possible good; and prevent all ill that can be avoided, in the Care of his *Plantations*, his *Stock* and his *Crop*: that the *Established Husbandman* will find many *profitable* things therein with which he was not *before acquainted*, and that the *young Farmer* will set out in his *Profession* with the Advantage of others *Experience*.

The Plates will contain Figures beautifully engraved from Original Drawings.

1. Of the Instruments of Husbandry used in different Counties in *England*.
2. Of all the poisonous Plants in *England*.
3. Of the most useful and valuable Herbs wild or cultivated; and various other Subjects.

The A U T H O R S

AND

P R O P R I E T O R S.





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# T O T H E R E A D E R.

**T**HE Design of this Work is to inform the industrious Husbandman in what manner he may get most by his Farm; at the same time doing least Damage to the Land; or in many Cases improving it all the while.

What we shall say on these Heads will be useful to the Land-owner as well as to the Tenant: and we shall be glad to instruct the Gentleman, while we assist the Farmer.

Many Things have been written concerning Husbandry; some true and others false: but all that is valuable in those Books may be comprized in a small Compass; and we shall make it one part of our Business to pick the few Grains of Corn from the Loads of Chaff, and present them clean to the Reader.

A great deal has been done of late Years to amend the old Methods of Husbandry; but the Experiments have been made some in one Place, and some in another. In treating of these we shall take the needful Pains to collect all together; and after that leave the experienced Farmer to make his Choice of such as best suit his Purpose; tho' not without Advice on each Head.

Many things have been of late also published as Discoveries of great Advantage, which have their Grounds only in Fancy or Mistake: these we shall carefully separate from the true Improvements; condemning them as they deserve: for, to mislead the practical Husbandman by false Relations; and entice him to a new Method by great Promises, which have not their Foundation in Fact, is both wicked and cruel.

This has been the Fault of many Books on the Subject; and too often an industrious Family has been ruined by believing them. It is this Custom of boldly advancing Falsities, that has brought Discredit upon the Truth; and to the ill Success of Experiments propos'd by such deceitful Persons, is owing the present Backwardness to meddle with any new Practice.

The Generality of Writers complain heavily of this Unwillingness in the Country People to follow their Methods; and they give it the harsh Names of Obstinacy and Folly: the worst exclaim the most; and all of them with very little Reason.

It becomes us to say, on the contrary, upon our own Knowledge, that  
B either



either the Farmers of this Kingdom are at present very different from those who lived when some of these Complaints were made; or else that the Accusations were altogether false.

Dr. PLOT says, in his History of Oxfordshire, that the Husbandmen of that County wou'd neither tell him what were their old Methods of proceeding, nor learn from him any others: Dr. MORETON, in his Account of Northamptonshire, makes the same Complaints; and many other Instances might be produc'd.

The Gentleman, upon whose Materials this Work is founded, has been in both those as well as most of our other Counties; and it appears plainly, from his Account, that the Farmers in each were very willing to let him know their own Practice; and as ready to give any new Method a fair Tryal, which was propos'd to them in a plain and reasonable Manner.

This Gentleman actually made many Improvements in the Husbandry of those Counties, as will be seen hereafter; and he every where speaks of the Farmers, as we have always found them, both there and elsewhere, a plain upright sensible Body of Men: who for the Sake of their Families will continue in their old Course, except a new one that is propos'd be well explained to them: but who are always ready to hear such as are able to instruct them.

Many Improvements will be pro-

pos'd to their Consideration in the ensuing Sheets; but in order to suit the Work to Reason and Experience, we shall every where shew upon what Grounds they are founded; and we hope they will then take or refuse them, according to their own Judgments.

But altho' there will be many new Things thus offer'd in our Work, it will not consist of such entirely. We shall in general be more careful to improve the old, than ambitious to advance new Methods. We shall in every Article endeavour to teach the considerate Farmer to make the best Use of his own Experience, and shall desire he will let it in all Things finally direct and guide him.

When that which is propos'd, tho' it be ever so new, is in itself right, what he before knows in general of the Subject will confirm it: and if that safe and wise Adviser, his Experience, in any Part fairly condemn the Practice, let him not think it worth a Tryal.

We propose, upon the whole, to lay before the young Husbandman a useful Plan, and teach him to follow it with Spirit, and Discretion: to tell him how to pursue an Advantage, and where to stop: and, in this Manner, if any one be ignorant, to instruct him; and if any one be poor, who is willing to be industrious, to shew him the Way at once to enrich himself, and to oblige and serve his Landlord.

The AUTHORS.





A  
COMPLEAT BODY  
OF  
HUSBANDRY.

BOOK I.

*Of the SOIL.*

IN EIGHTEEN CHAPTERS.

CHAP.

- I. Of discovering the Nature of a Soil by the Situation and Surface.
- II. Of judging of a Soil by its common Produce.
- III. Of judging of a Soil by the Growth of Trees.
- IV. Of the several Kinds of Soils.
- V. Of clayey Soils in general.
- VI. Of red clayey Soils for Tillage.
- VII. Of red clayey Soils for Pasturage.
- VIII. Of red clayey Soils for Trees.

CHAP.

- IX. Of yellow clayey Soils for Tillage.
- X. Of yellow clayey Soil for Pasturage.
- XI. Of yellow clayey Soils for Trees.
- XII. Of the white clayey Soil.
- XIII. Of the black clayey Soil.
- XIV. Of loamy Soils.
- XV. Of sandy Soils.
- XVI. Of gravelly and stoney Soils.
- XVII. Of chalky Soils.
- XVIII. Of mellow Earth.

With an Explanation of their several Natures, and general Directions for their Improvement.

The INTRODUCTION.

*Treating of the Soil in general.*



HE Soil is the Ground or Earth, in which the Farmer's Crop is to grow.

A pure Soil is a fine mellow Mould without any Mixture of other Matter; but this is found only in a few Places. All other Soils are compos'd of this Mould, with natural Additions of one or more less fertile Ingredients; such as Sands, Stones, Clay, and the like: and according as these are in a greater or lesser Quantity, the Soil is worse or better.

Some of these added Matters are also in their natural Qualities more pernicious than others:

the Soil always takes its Name from them; and according to their Nature it is suited to particular Purposes: a sandy Soil doing best with some kind of Crops, a loamy with others; and in the same manner the rest.

The Soil thus mix'd by Nature is to be the first Article in the Farmer's Consideration; for on that will depend in a great Measure his Profits. It is easily examin'd; for often it shews it self on the Surface; and it is the first thing that appears on breaking up the Ground. It is thence call'd the underturf Earth; and also vegetable Earth, because it furnishes the needful Matter for the Growth of Vegetables, or Trees and Herbage of all Kinds.

Pure Mould is the lightest of those several Substances which compose the Earth, and therefore even with these Mixtures it naturally lies above



above the others. It covers them in some Places to a greater, and in others to a lesser Depth: and the Matter by which it is debas'd is usually of the Nature of the Layer which lies immediately under it; whether that be Sand, Gravel, Stone, Clay or whatsoever.

This Mixture of the Soil with the under Layer or Bed, is often made greater by the Carelessness of the Husbandman, who cuts too deep with his Plow, and turns up a part of the next Matter with it: but it is almost always mix'd, in some Degree, even where the Plow or Spade never came. Most probably the rich Mould, when the World was first made, was spread every where in Purity over the several other Beds; but at NOAH's Flood they were in part mix'd together: and hence the Land is less fruitful than it was at first.

When the Soil is purest, it is always richest: and it is known to be of this Nature, by its blackish Colour, and its mellow Softness. Pure Mould is tender and pliant; short, and ready to crumble and moulder to Pieces, from which it has its Name; and it is also call'd the Heart of the Land; and Live Earth, in some Places, because it is the Strength of the Ground, and the Sustenance of Herbage.

It follows naturally, that in Proportion as this Heart of the Land is less mix'd with those barren Substances, it will be more fruitful; and contrarywise, where it is more debas'd, it will have less Fertility. It is plain also, that in the former Case, it will need less Dressing, and Manure; and in the latter more: so that the same Condition which makes it unfruitful, renders it also expensive.

Now altho' this Condition of the Soil be most surely discover'd by opening and examining the Ground; it may in some Measure be distinguish'd by the Surface, and by its Produce. We shall first therefore treat of those Marks which are most obvious; and afterwards of the others, as they rise in the Course of the Enquiry.

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#### CHAP. I.

##### *Of discovering the Nature of a Soil by the Situation and Surface.*

**T**HE Farmer naturally takes a View of the Land before he rents it; and even in this superficial Examination he will make some Discoveries, from observing the Situation and the Surface.

In many Parts of ENGLAND the Hills are in general more poor and barren; and the low Grounds more rich and fruitful; and this from a very natural Cause.

The fine Mould being light and loose, is easily wash'd from its stony or other Mixtures in the general Soil; and being carry'd off in some Degree from the hilly Parts, by the same Rains which separate it, the Stony or other Remainder becomes so much the poorer. And from the same Cause, the Valleys are enrich'd beyond their natural Condition, because the fine Earth, which is wash'd from the Soil of the Hills, is carry'd to them.

This the Farmer in most Places experiences to his Cost; the Crop being as much thinner on the Hills than in the Valley, as from his Labour and Expence he might otherwise expect it to be greater.

In some Places the Earth entirely wants this Soil, which is its proper Covering; and what shou'd in the Course of Nature be its lower Parts, lie naked. Thus Sand is seen upon the Surface of the Ground in some Counties, and naked Rocks upon the Hills in others. There is in these Cases no Mixture of Mould with the former, nor any Coat of it over the latter; neither does there grow so much as Grass to cover them. The Farmer is here at once a Judge of the Land: and may declare it to be of scarce any Value; for entire Sand can only be fitted for Husbandry at a great Expence; and bare Rocks not at all.

In some Parts of ENGLAND there also rise here and there Banks of entire Clay, and others of hard and pure Chalk, up to the Surface of the Ground. The Clay is often in this Case almost as barren as the Rock: but a short Grass will grow upon the Chalk.

Of these four Cases that of the Rock is the only one quite unconquerable; nothing can make that fruitful: the other three may be brought to produce tolerable Crops, according to the Methods hereafter to be deliver'd; but the Expence is sometimes too great for the Produce, tho' the Rent be ever so little.

In all these Cases the Husbandman may distinguish the general Nature of the Soil by its Aspect on the Surface; we shall shew, in a succeeding Chapter, how he may judge of it by its Produce.

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#### CHAP. II.

##### *Of judging of a Soil by its common Produce.*

**W**HEN the Farmer has examined a Piece of Land according to its Situation and Surface, so far as the latter appears naked; he is next to observe carefully its natural Produce; and the State of the Crops that are upon it: from these he will be able to form a Judgment not only of its Condition as to Heart and Richness, but of the particular Nature of each Part; and to know the Qualities as well as Value of the Soil.

Where he sees the Grass, Corn, and other valuable Growths look strong and healthy, it is a Proof that the Soil is either rich by Nature, or capable of being made so by Improvement; so that his future Pains bestow'd upon it will not lose their Reward.

Even the free Growth of Weeds (unless it be of some particular Kinds, as Fern, Rushes and the like, which betoken Barrenness for better Things) is a Proof of Goodness in the Ground. Care will destroy these; and the same Heart in the Land which before supported them, will give Sustenance to the Crop.

Let him examine well not only how liable the Soil is to be over-run with Weeds, but of what



what Nature and Kind they are which grow upon it: for as there are some which shew Barrenness, there are others which betoken Fertility. And altho' some of these wild Herbs are common to many Soils, yet the greater Part are so far peculiar to certain Kinds, that the Nature and Quality of the Land may be known by them.

That Sort of Fern, which is named in Books Female Fern, and which the common People call Brakes, is a sure Token of Barrenness. Its common Place of growing is on Heaths. The other ordinary Kind of Fern which is smaller, and is called Male Fern, is of a different Nature; it shews that the Soil is in that Part suited to the Growth of Trees, and it flourishes most under their Shade.

In the same Manner Clods of Rushes and jointed Grass, betoken a poor, damp, and as it is commonly express'd, a sour Land: but, in the Fen Countries, where a dark green short Grass grows among them; where the Rushes stand more dispers'd, not in such Bunches, and where there are seen some yellow short flag Leaves among them, it may inform the Farmer, that there is Peat underneath. It is by this the experienced Tenant judges about WHITLESEA, and in other Parts of the ISLE of ELY; where I have known them offer a large Premium for a certain Liberty of digging Peat upon the Land they were about to take, and that without opening the Ground.

These already named are the Weeds which most of all betoken Barrenness: many of those, which will be spoken of hereafter, on the contrary shew the Land to have Strength and Richness.

There is the more Certainty in this Rule of Judging, because the Weeds which grow on rich Lands, are in a manner peculiar to them. There is no Plant whatsoever that is found in a Clayey, among a Stony, or on a Chalkey Soil, that is not also to be found in such as are rich and valuable: But there are many Weeds which are the natural Produce of rich, and many which grow in the same Manner on light Soils, no one of which was ever seen either upon a Chalkey, Stony, or a Clayey Land.

The Evidence Nature gives this Way, of the Qualities and Value of a Soil, is however liable to mistake, unless heedfully attended. The Farmer must take Care that he form his Judgment, not by those Weeds that grow equally on bad and in good Soils; but if he sees a Plenty of such as grow only on good ones, he may then be sure the Land is rich.

If he see a great Quantity of Fumitory, a low Weed with divided Leaves and purple Flowers; if several of the Kinds of Orach, grow free and strong; and in general, if such Weeds as are found in the mellow Beds of a well cultivated Garden, spring up in Abundance on the Ground, he may be sure the Soil is rich, fruitful and fine; for not one of these will ever grow free and strong on a starv'd, or in a cold clayey Ground.

When he sees the Corn Marigold, which the Farmers call the Golding or Horse Gold, in Abundance, he may be sure the Soil is light and sandy. It is a Land that will naturally bear

Rye better than any other, but that may be brought to greater Value by Culture, and suited to every Species of Corn.

Where the Blew-bottle is in great Plenty, and the Flowers are of a fine Colour, it shews the Soil is also light and loose, but not without its natural Heart: this Weed and Cockle are a Proof of a light but good Soil, naturally fit for Barley and Wheat.

When the Flowers of the Blew-bottle look pale and whitish, and the Herb itself grows meagre, it is a Sign of a stoney or chalkey Soil; or else that there is too much Sand in the Ground; for either of these Ingredients will occasion that Change.

If there be a large Quantity of Wild Garlick, which is called in some Places Cow Garlick, among the Corn, it is a Token that the Land is of a clayey Nature. In HERTFORDSHIRE this Weed gets sometimes into a stoney Ground, but that is not its natural Soil.

May-Weed, call'd also in some Places Wild Camomile, is in general a Mark of a loamy Soil; and the same Quality in the Land is shewn by the Wild Parsnip, which in BUCKINGHAMSHIRE and some of the neighbouring Counties they call Hog Weed and Swine Root. It is indeed the Parsnip not cultivated.

The Names of these and other Herbs, among the Country People, vary greatly. In some Places that of May Weed is given to Fumitory before mentioned; and the like Confusion has been common with many others. It is therefore necessary to explain what is meant when they are used.

The Weeds which betoken a Soil altogether sandy are generally low; and those of a stony one, are commonly poor and stragling. Where there is a great deal of small scabious, Rampion with scabious Heads, and the little wild Madder, the Farmer may be sure there is too much Sand in the Ground: and when he sees the small Throatwort and the like, he may know it is stony.

In the same Manner a chalky Soil is discover'd by its starv'd Appearance, by the Scarcity and Lowness of the Weeds, and by the natural Growth of the Base Rocket, and the like Plants, which are scarce in other Places. The yellow Stonecrop or Wall Pepper, so common on our old Walls, grows also on the Ground in these Places, particularly on the chalky Hills of KENT:

### C H A P. III.

#### *Of judging of a Soil by the Growth of Trees.*

WHEN the Farmer has observed the particular Kinds of Weeds; and form'd from them, and from the external Appearance of the Land, a general Notion of its Nature and Value. Let him observe the Growth of the Trees; particularly of those in the Hedge Rows.

If they be tall, strait, full branched, and well headed, he may be sure the Soil is, as the Husbandmen say, good at Heart: on the contrary, where the Trees grow irregular, low, crooked,



or stubbed, 'tis a Proof something is bad at bottom.

In this general Rule he is however, in the same Manner as in the former, to admit certain Cautions. He is not to expect every particular Tree he sees to be of this fair Kind; for Accidents will injure some: nor is he to imagine every sort of Tree must thrive equally, to shew the Strength of the Soil.

There are very good Lands on which some Kinds of Trees will grow fair and fine, while others do not answer so well: this is confirm'd by frequent Observation; and it may be generally explain'd from the Depth of the Soil, and the Nature of the next Layer under it.

I was some Years ago in NORTHAMPTONSHIRE, at a Town call'd BRAMPTON IN THE ASH, where I soon found what had been the Occasion of the Name. The Ash Tree grows thereabouts with a Freedom and Excellence not known any where beside.

These Trees are all about that Place tall, strait, and of even Growth, so that their Appearance surpriz'd me: and on cutting them the Grain appear'd yet more beautiful. It was soft, regular and full, beyond any I have seen.

At CRANFORD, in the same County, the Ash grows no better than in other Places, but the witch Elm is remarkable for its quick Shooting, and its Beauty. In the same Manner, the Elm in many Parts of BUCKINGHAMSHIRE, and the Beech in SUSSEX, succeed beyond all other Trees.

The judicious Husbandman from this may take his Direction what Trees to plant in his Grounds, preferably to others; Nature giving him the Instruction: but of this we shall treat in its proper Place. Trees are mention'd here only to instruct the Farmer to judge of the Soil by their Growth, as well as by its other Produce; and to inform him not to judge only by the general, but even by particular Kinds in this Case; for where any one Species of the Trees in the Hedge Rows thrives particularly well, he may be sure the Soil of the neighbouring Grounds has a Heart.



#### C H A P. IV.

##### *Of the several Kinds of Soils.*

WE have describ'd in the First Chapter what Vegetable Mould shou'd be when pure; and we have nam'd the several Kinds of Mixtures from the Underlayers of the Earth which render it less fruitful; such as Stone, Clay, Sand, and the like: We come now to consider the Soils as differently mix'd with these, and thence distinguish'd by particular Names.

There are Places, as already observ'd, where these several Substances, Stone, Clay and Sand, appear entire and unmix'd on the Surface of the Ground; but these, as there said, are then barren: we are here to enquire into the Nature, not of these singly, but of those Earths which are produced by a Mixture of one or other of them with the vegetable Mould. These are what the Husbandman calls Soils, and he names them according to the Substance which makes

the Mixture. Thus they are called clayey, loamy, sandy, stony, gravelly, or chalky Soils.

These are their several general Names, by which they are known in all Counties, and which are Terms understood in all Places, because they are founded in Reason, and upon Nature: but beside these there are a great many others. To enumerate all wou'd be to make this Part of the Work a Dictionary, not a System: however, the principal shall not be omitted.

The fine rich mellow Soil is call'd in LINCOLNSHIRE Moory Land, because it is the Soil of the Moors and Fens. It is dark and crumbly. A Soil of much the same kind in the higher Grounds of LEICESTERSHIRE and WARWICKSHIRE is call'd Hen Mould, it is dark colour'd, light and spungy. This, as well as the other, is better for Pasturage than for the Plow.

What they call Hen Mould in NORTHAMPTONSHIRE and HUNTINGDONSHIRE, differs from this entirely. It is a rich but firm Earth of a blackish Colour, with Streaks of white like Mouldiness; and the more there is of this, the richer is the Soil. We see by this double Use of the same Word, how easy it is to confound one Thing with another in Husbandry: the Farmer must be careful to avoid this, or he can have little Improvement from what he hears or reads.

The clayey Soils are distinguish'd in HERTFORDSHIRE and BUCKINGHAMSHIRE according to their Colours, into the red, yellow, white and black: but red Land in HUNTINGDONSHIRE means quite another Thing, as will be seen hereafter.

In NORTHAMPTONSHIRE there is a sort of clayey Soil known by the Name of woodland Soil, because it is the Sort of Earth on which the Woods usually grow in that County. This is damp, tough, and sad colour'd; it consists of vegetable Earth with a large Mixture of black Clay; and there is always a Layer of found blackish Clay under it.

Sandy Soils are in most Counties distinguish'd also by their Colour; as the white, the yellow, and the red: but they have in some Places particular Names. All Soils have some Sand in them, even the richest: this may be seen by walking over them after a Shower of Rain: for tho' the earthy Part cover and conceal the Sand otherwise, yet the Showers washing it off, the Grains of Sand sparkle and glitter at these Times.

A Soil is not however to be call'd sandy because there is a small Quantity of Sand thus mix'd among it; 'tis only when the Sand is predominant, that it has this Name.

What is called a crenchy Soil at COLLEYWESTON, and other Places in NORTHAMPTONSHIRE, is a sandy Earth in which there are Bits of Stone, and Pieces of broken Shells that look as if they were calcin'd: as indeed they are by the Effects of the Sun and Air, and they tend greatly to improve the Land.

The Red Land as it is call'd about HALSTON, HASLBECH and ROWELL in the same County, is a sandy Soil of a redish Colour, with Pieces of a redish Kind of Sand Stone among it, and sometimes other Matters.

That



That which is called in LEICESTERSHIRE and WARWICKSHIRE a Kealy Soil, is a stoney Land; compos'd of a good Earth, with a great deal of Stone or Slate among it like the Chipings of a Mason's Yard. This in many Places bears good Crops of Barley when the larger Stones are cleared off.

Lastly, what is called Chisely Land in most of our midland Counties is a kind of Loamy Soil, often very fit for Wheat, Barley or Rye.

As the Eye may at Sight distinguish the general Nature and Value of a Land by its Produce: the Plough at once discovers the particular Nature of the Soil according to these Distinctions.

The Moory Soil turns up easy and free: its Colour and its Mellowness readily distinguish it. The Clayey Lands are hardest to cut, and hang in tough Clods. The Hen Mould that is streaked shews itself when the Sod is first open'd, for it is rarely seen afterwards. The Sandy Soils turn up easily and regularly; and the Stony more unequally. The loamy when they are pure cut easy, and the chalky are always dry and hard. That particular Kind of the Loamy Soil called Chisely, has its Name from its falling off the Plough in Pieces like the cutting of a Chissel: for it is one of the softest of the loamy Kinds. It is not so loose as the sandy Soils, which fall off from the Irons like Bran or Saw-dust; nor so tough as the Clay, that rise in long Flakes; but breaks in small Pieces. When a Land rises in this Manner to the Plough, the Farmers in many Places say it brackles, and they look upon it to be a good Property.

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#### CHAP. V.

##### *Of Clayey Soils in general.*

CLAYS, tho' distinguish'd according to their Colours, under the Terms of red, yellow, black and white, and called in particular Places under their different Appearances, by a Variety of Names, yet ALL agree in their general Nature, and may be conveniently first treated of together.

They differ from all other Soils in that they are tough, wet, and cold: and in Proportion as they are mixt in greater or lesser Quantity in the Lands, they give them those Properties in a greater or lesser Degree.

Some of the Kinds are indeed so much tougher than the others, that an equal Mixture of them does more hurt. Thus the red Clays debase Lands more than any other Kind: the yellow are next in Stiffness and Coldness to these; the black are less wet and tough than either of the former, and the white least of all. However, the yellow in a somewhat larger Proportion, will do equal Mischief with the red in a smaller, and so of the rest: the Difference as at first observ'd, being more in the Quantity of the Clay in the Soil, than according to the particular Kind.

The Improvement of all Soils depends in a great Measure upon the breaking them, by

which Means their Parts are more exposed to the Sun and Air, and are made more fit to receive the different Kinds of Seeds.

As the clayey Soils are of all others the most tough, they most of all require this Care. We know that the Effect of Fire is to reduce this tough Earth into a loose crumbly Matter: And whatever Fire will do on these Occasions, the Action of the Sun and Air will also perform, only it requires more Time. Oystershells that have lain a great while on the Sea Shores, are as perfectly calcin'd by the Sun and Air, as if they had been in the Fire. And in the same Manner those Shells which are found in Marle, and other Earths, when they have been a while spread upon the Ground, grow soft and crumbly. It is the same with Clay: the Sun and Air will take away its tough Quality, as the Fire does: and frequent Plowing meliorates clayey Soils, by turning up the Clods in different Positions to the Sun and Air, and by assisting the Operation in breaking them to pieces.

This is the Way wherein frequent Plowing operates upon a clayey Soil, and the Farmer who tries it will never be deceived in his Expectations.

All Clay Lands are known by these Qualities. They hold the Water that falls on them; and when well wetted, they are a great while before they dry: in the same Manner when thoroughly dry, they are not soon wetted. In a dry Season the Land cracks in Chinks. If it be plow'd when wet, it sticks to the Plow like Mortar; and in a dry Season the Plow tears it up in great hard Clods, which are all Clay at the Bottom. For this Reason where the Coat of Soil is not thick, the Farmer should not plow deep, for he will then injure his Land by mixing the Clay among it.

All the clayey Soils require a great deal of Industry and Care, as well as Knowledge, in the Dressing and Management: but when the Toughness is got the better of, so that the Farmer can get his Grain into it, and see it well cover'd, it very often yields large Crops. The stiffest clayey Soil I have ever seen in ENGLAND, is about THRAPSTON in NORTHAMPTONSHIRE; and yet with the thorough Management they use there, it is one of the richest Lands in the Country.

Having thus treated of the clayey Soils in general, and shewn the great Necessity of their careful Culture, we shall proceed to examine them particularly, and deliver the several Methods which have been found most successful in treating the several Kinds.

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#### CHAP. VI.

##### *Of red clayey Soils for Tillage.*

THE redish Clay, which gives the Colour and Name to these Soils, is the toughest and coldest of all the Kinds; and requires the most Pains in the Husbandman to subdue its Nature.

It is frequent in its pure and entire State in the Counties of WARWICK, LEICESTER, YORK and NORTHAMPTON: they have also their Share of



of it in BUCKINGHAMSHIRE: in all these Places it is perceived plain enough in the Roads; which are stiff and deep in Winter, and are full of great Cracks in Summer.

It lies in the same Places under the Soil in all their Fields, and is in a greater or lesser Degree mix'd with it every where thereabouts. The mix'd Soil over the Bed of pure Clay is generally of a considerable Thickness, which is very happy for the Farmer, as it gives him the Liberty of plowing deep, which this Land requires more than any other.

The first Method for the improving this Kind of Soil is, by frequently repeating these deep Plowings to break and separate the Clods over and over, as the Sun and Air calcine them.

To this the Farmer is to add the Assistance of Dressings. And it is the particular Quality of this Clay, that it will receive all kinds of Manures, and be improved by them: but then the Labour is to be equal to the Expence, for without the frequent plowing already mention'd, nothing will take Effect upon it.

Dung does not readily mix with this Sort of Soil; but when it is well plow'd in, 'tis of great Service. This however is not the Kind that agrees best with it; in NORTHAMPTONSHIRE they manure it with Lime to some Advantage; in HERTFORDSHIRE and BUCKINGHAMSHIRE they use Soot and Ashes; but that which agrees best of all with its Nature is Chalk. This is now the general Practice; and the Farmers in most Parts of ENGLAND begin to find the Advantages of it.

The young Husbandman must not be dishearten'd at the Expence of this Sort of Dressing, or the Labour of such frequent Plowings; for he will be sure to reap the Benefit of it: it is much more chargeable to dress a Piece of the red clayey Soil, than any other whatsoever; but then the Advantage lasts long in Proportion: a Field of this Soil, once well dressed, will keep in Heart fifteen or sixteen Years.

Indeed it may be remarked of the clayey Soils in general; and most of all of this in particular, that altho' no Ground is so stubborn or so barren when neglected; none has so many or so great and good Qualities, when it has been thoroughly wrought in the above described Manner.

Perhaps it may be said with Truth, that the more tough and stubborn these Soils are, the richer they prove when they are thoroughly subdued. Of this I shall give an Instance which has fallen within my own Knowledge.

There is near CAWCOTE in NORTHAMPTONSHIRE, a Piece of small Extent, the most tough and untractable perhaps in that County, or in the whole Kingdom. This is indeed almost an entire dusky Clay. For a great many Years the Farmers all neglected it, and it produc'd almost nothing; at length about thirteen Years ago a young Man dress'd it thoroughly, and he soon found the Advantage; which continues to this Time. For with a moderate Care and Industry, it is now the richest Piece of Ground in the Country.

This is an Example the young Farmers in general should thoroughly mind: not to be sparing

in Cost, much less in Labour, upon a Sort of Land which never fails to return them the greatest, and the most lasting Advantages.

When this Kind of Soil is redest, it is most clayey: where of a dusky Colour it frequently, tho' not always, has more of the right vegetable Earth among it. In the latter Case it yields the larger Crop with a little dressing; but when the former is well manag'd it greatly exceeds it: the Crops of this Soil may be properly called the Rewards of Industry.

The clayey Soils have their Advantages and Disadvantages in respect of others with Regard to their Crops; and those of the red Kind most of all, these being the most considerable.

In the first Place, the Crop upon a red clayey Soil is later in the Year before it arrives at its Perfection, than that which is sown with the same Circumstances upon a sandy, or indeed on any other Land. It is from this the clayey Soil has obtain'd among the Farmers, the Name of the coldest of all Soils.

I have found also by frequent Observation, that these Soils are coldest of all where the Layer or Bed of pure Clay that lies under the Soil is thickest. This is known when Pits are open'd for this Clay for various Uses, for which it is excellent, and which shall be enumerated hereafter. And where it runs very deep, the Harvest is always naturally later in Proportion.

It is not a wonder that a Soil should be very cold which is almost continually wet: a Piece of such Land certainly is more affected by cold than such as is dry; as we see by this that when a sharp Frost comes on at once in a dry Season, it frequently does little Harm to the young Growths of the Garden or the Field; but Frost after Rain is destructive.

The Damage by Frost is not so immediate in a clayey Soil; but when it has taken hold it is more lasting. A slight Frost does not penetrate Clay so quickly as it does other Earth: but when a clayey Soil is once harden'd by the Frost, it remains longer hard than any other.

When this red clayey Soil is well wrought, Wheat succeeds excellently upon it. Barley sometimes yields a good Crop, but not constantly, for it depends on the Season; if that prove dry the Barley does well; but if not it comes to little: for this Soil holds the Water a great while, and Barley cannot bear a great deal of wet to lie about the Roots.

Beans succeed extremely well in this Earth, for they will bear a great deal of Water, nay they require it: for in dry Seasons and on a loose Land, they yield nothing in Comparison of their Produce on these Soils. Beans require a great deal of Nourishment, and this red clayey Soil is the richest feeding Land we have when well prepared.

It is not wonderful that proper Crops should grow well upon a Land which holds so much Water: for we see that Mint, and many other Herbs, will grow in Water where there is no Earth at all.

Notwithstanding the Advantages the red clayey Soil has over many others when carefully manur'd; yet there are Accidents also to which it is liable; and which are owing to its Original Nature,



Nature, of these I shall recount some few which I have seen.

If the Season prove dripping for a long Time together, and there fall a great deal of Rain in MAY, the Crop upon this Soil always suffers. The Beans bear it best: the Wheat becomes stunted and pale, and the Barley turns yellow, and if the Season continue wet they don't well recover.

In a wet and frosty Spring, the Crops of Pease on this Soil are also apt to fail. The sure Sign of this is the green Shoot turning red: and it is confirm'd by Experience, that in this Case it never recovers. Upon other Lands the Shoot will get this Cast in a bad Season; but when once it happens in a red clayey Soil all is lost.

When this happens, it is best to know what one has to expect. As the Crop will never come to itself, the right Method is to plow it up at once, and sow the Ground with Oats.

It was for the Reason of this Accident I did not mention Pease among the Crops that succeed best on this Soil. But beside Wheat and Beans, as also frequently Barley, it is excellent for Clover; and no Land succeeds better with Turnips.

As to the Accidents I have mention'd as attending this Soil more than others, they are all owing to the Toughness of its Original Nature; and I have from many Years Experience, found that they happen always most in Proportion as it has been least dress'd. I have observ'd before, that it is in itself a very bad Soil; but that it becomes very rich and profitable by being well manur'd. And if I may speak what I have seen by my own Experience, it is that those Accidents I have named, are all owing to the imperfect manuring of this Soil; for I have seen several Years that my Crops have all stood well upon a Field of this Nature, when my Neighbours lost theirs, or they produced very little: and the only Cause of this was, that I spar'd neither Chalk nor Husbandry; while they were frugal of both: and oftentimes my good Success and their Loss, have happen'd several Years after my last Chalking of the Ground.

My Advice therefore to the young Farmer, who has a Piece of Land with this Soil upon his Hands, is.

First, not to spare either Labour or Expence upon it in the Beginning, for all this will be return'd to him ten-fold. Let him plow it thoroughly and often, and take Care that the Plow cut deep. Let him employ a careful and honest Plowman that will mind his Business, not an idle Boy, as is too often done. And let him go over the Land frequently himself to see that it is well cut up, and well broke in every Part.

In the second Place, let him bestow Chalk enough upon it, and see it be worked well in; or if Chalk cannot be had, let him use some of the other Manures just mention'd. When this is thoroughly done at first, common Care and Industry will serve afterwards: and from this he will have a Soil, which instead of holding the Water to chill his Crops while young, will let the wet when it is too much, below the Roots, and will always detain enough.

Thirdly, let him depend chiefly upon his Wheat: for that Grain upon a red clayey Soil thus manur'd, will never fail him. He may also be sure of Beans, Turnips and Clover, for these never fail. He may in dry Seasons stand a fair Chance for Barley: but Wheat is the sure and certain Commodity for this Soil.

Lastly, when he has thus got his Land into good Order by his Industry and Expence, don't let him drain it of its Heart again by Covetousness or Folly. Let him not draw away its Strength by cross cropping, or too frequent sowing. Moderation is the Rule of all Things in this Life. There is no Way to be poor so quickly, as the Desire of growing rich too fast.

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## CHAP. VII.

### *Of red clayey Soils for Pasturage.*

THE Soil which is cover'd with a Turf, and that which has been many Years open'd by the Plow, will be found to differ a great deal when brought together, altho' they lie in adjoining Fields, and are in their Original altogether the same.

I remember about eight Years since to have been surpriz'd by this Observation in BUCKINGHAMSHIRE, but I have since repeated it with the same Success in other Places; where the Earth has been to Appearance very different in a plow'd and a Pasture Ground, though only a Hedge parted them. I mention this Circumstance that no Mistake may happen in judging of this Soil, but that the Farmer may know it to be the same when he sees it. In the BUCKINGHAMSHIRE Experiment, I took up a Piece of a red clayey Land from a Field not well manur'd, which was close, hard, and high colour'd: after this cutting thro' the Turf, in an adjoining Pasture, I took up a Piece of the Soil there, which altho' redish and clayey, yet was less compact than the other, and of a darker Colour. The Cause of this is, that in Pastures the Soil keeps more entire, and has its due natural Portion of vegetable Earth among it: whereas in plowed Lands, this is in a great Measure wash'd away, and taken up by the Crops, so that the clayey Part remains more visible.

When the Farmer therefore finds under the Turf in his Pasture, a Soil that is like that of his red clayey Lands, only somewhat darker and mellowed, he may be assur'd that it is the same in its Nature; and would appear the same with the other after a little plowing.

This Soil when there is a due Proportion of vegetable Earth among it, is excellent for Pasturage. It has an unconquerable Heart, and the Produce is strong. Where it is too near entire Clay, it must be assisted by dressings.

I have observ'd throughout all BUCKINGHAMSHIRE, that where low Grounds have this red clayey Soil, they never fail to produce great Quantities of Grass, and that excellent in its Kind, with little or no Manure. The Reason is, that the Rains bring down the light fine Earth from the higher Lands; and the Overflowings of the Rivers leave their fine Mud upon them, whence they are render'd fertile in a surprizing Manner.

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This may be a Lesson to the Farmer, that the best of all Manure for this Soil in Pasture Grounds, is the Mud taken from the Bottom of Waters. Nature is the best of all Instructors. This is the Practice every where in BUCKINGHAMSHIRE: They drag up the Mud from the Bottoms of their little Rivulets, and it enriches their Pastures that have this Soil in a surprizing Manner.

The Reason why this red clayey Soil receives more good from the Washings of the Hills, the Fall of Rains, and Overflowings of Waters in Pasturage than any other Kind, is, that it retains the fine vegetable Earth which is brought upon it; the finest Part of which gets through the others. Thus its Toughness is an Advantage.

Even pure Rain Water as it falls from the Clouds, contains a great deal of this vegetable Earth, as it may be prov'd by Experiments. Now when this falls upon a loose Soil, the Water passes through, and this pure Earth, which is the true Nourishment of Vegetables with it: but when it falls upon this tough Soil, or is otherwise brought upon it, the Water is detain'd a great while, and this fine Earth with it; and the Earth is kept when the Water has by Degrees got through. So that all which comes is preserv'd for the Benefit of the Herbage.

This is the Reason why Pastures that have a red clayey Soil are always fruitful, in whatsoever Situation; but most when they lie low: as Experience in all the Counties where I have been confirms.

What they call Woodland in NORTHAMPTONSHIRE, which, as before observ'd, is a red clayey Soil, tho' in some Places render'd dusky by Accidents, is also very fruitful in Pasturage.

I don't wonder therefore, that in many Parts of the last named County, the Farmers have a great while prefer'd the Pasture to the Corn Lands in a great many Places; and that large Quantities of what was heretofore Tillage Ground, is enclosed and converted into Pasture. For the red clayey Soil is very frequent there; and this requires a great deal of Labour and Expence in Tillage, but very little for Pasturage: there is also a great deal of Hazard in the former Way, as observ'd already concerning the Crops of Barley and of Pease: whereas when it is laid down to Pasturage, there is no Hazard at all.

But altho' I do not wonder at this Custom among the former NORTHAMPTONSHIRE Farmers, yet the carrying it too far is a Practice not to be commended. For there should always be a Proportion preserv'd between the Pasture and Tillage Land; that the Dung of one be enough to supply the other. Of this I shall speak more largely in its Place: it is only hinted here, lest hasty Youths should seize on the Expedient of converting Arable Land to Pasturage, without seeing Consequences.

For Proof of what I have advanced, that there are few Soils better than the red clayey Land for Pasturage, I shall observe, that the finest and richest Knot of Pastures I have ever met with, lies about the Point where the Counties of LEICESTER, WARWICK and NORTHAMPTON meet, particularly in the Lordships of

ASHLEY, ELTINGTON and THURNLEY; and in all these the Soil is a red clayey one, only render'd dusky by the greater Mixture of vegetable Mould, as it has been observ'd already there always is in Pastures.

I have thus endeavour'd to shew the young Farmer the Nature of this Soil in Pastures, and its Value: as also to give him the Reasons of it: because I know when Things are understood, they are better remember'd.

The Advice I have to give him is this. Not to be too hasty in making Changes from Tillage Land to Pasture, or from Pasture to Tillage, because a great deal is to be consider'd: let him in general leave Things as they are in this Respect; at least till he has very well weigh'd them. Let him see that he keep up the Proportion between his Arable and Pasture: and let him not be hasty to lay down plow'd Lands into Pasture, to save Expence and prevent Hazard; nor on the other Hand, to turn up good Pastures for Corn Land, for the Sake of the first Crop. That will probably indeed be good, because of the Quantity of fine Earth originally in the Soil; but when this is exhausted, he sees at what an Expence of Labour and Manure, he must supply its Place; for the Soil is soon drain'd of this its natural Richness, and without the Assistance of Art afterwards will do little. There may be Occasions of making these Changes to Advantage, but let it never be done hastily. There can never be more Room for Consideration.

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## C H A P. VIII.

### *Of red clayey Soils for Trees.*

THE Planting of Trees, and the Manure of Pastures, are Subjects to be treated of hereafter in their Places: we are here only considering the Nature of particular Kinds of Soil, and they are nam'd barely to shew how they suit them.

Now the Consideration of Land, in respect of Trees, must be carry'd deeper than the Soil. This Term I have shewn takes in no more than the upper Covering of the Earth: but Trees strike their Roots deeper, and there seek their Nourishment.

However, as this Soil generally runs thicker than most others, and as it commonly has a Bed of the same red Clay under it, of which it principally consists; it is proper in this Work, wherein nothing is intended to be omitted that is useful, to consider the Soil in this Respect.

All Trees do not equally agree when young with all Soils, as is plain from Experience; nor do they thrive equally, when more grown, upon all Lands. This may be explain'd in the first Respect from the Richness, or the Poorness of the Soil or upper Earth itself: and in the latter, from its Bottom. Some Trees pierce deep into the Ground with their Roots, others spread them far and wide, under the Surface, at a small Depth: of the first kind is the Oak, and the Ash is of the latter. The Ash therefore may do in a Place where there is some little depth of good



Without therefore entering farther in this Place into Subjects that must be treated at large elsewhere, my Advice to the Farmer is, that when he is to plant upon this Soil, he look about the Grounds, and see what Trees thrive best, and select those Sorts for his Purpose. And he may account it one of the Advantages attending this Land, that it is not hurt by the Trees which are planted in it; as all others more or less are.

**T**HE yellow Clay of ENGLAND is in its Nature more nearly ally'd to the red than any other: and is next to that the most frequent. It is as universal in some Counties, as

What in many Places they call Hazel Mould, is a Mixture of yellow Clay, with more or less of a blackish mellow Earth. This makes the best Soil, that is naturally form'd of the yellow Clay; and is excellent for Wheat and Rye: it will also bear other Crops well, but these two best.

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The Improvement of the common yellow clayey Soil, which is in its own Nature much poorer than the hazel Mould just mention'd, is to be begun by frequent and deep Plowings. When the Clods are by this Means broke, and the Matter render'd less crumbly, the Manures are to be apply'd. I have found by Experience, that this Soil takes Manure better than the red; and I have discover'd by repeated Trials, that nothing is better for it than Chalk. Marle also is excellent, as will be shewn hereafter. Ashes, Soot, and even Sand, are useful also; and Dung, after the first Dressings, will mix well with it.

In OXFORDSHIRE they mix Chalk and Ashes to great Advantage.

In STAFFORDSHIRE, where this Soil is frequent in the common Fields, they sow it two Years, and let it lie fallow the third. They lay it in Ridges, or otherwise, according to the Condition; and make their Fallows toward the latter End of March. They plow it a second Time about three Months after, or a little sooner; and before this, they dress it with Cow-dung or Horse-dung, except when they fold it with Sheep, then it is immediately spread and cast under Furrow with the Plow, before the Sun and Rain exhaust and weaken it. Ten Weeks after this, that is toward the End of August, they plow it again to kill the Weeds; and to turn up the Manure. About the Week before Michaelmas they plow for sowing, and then the Manure is again turn'd and falls upon the Seed with the finest Part of the Land.

They sow Wheat upon the Land after this Dressing, and afterwards Beans, with both which the yellow clayey Soil excellently agrees after this Preparation. This is the STAFFORDSHIRE Practice in common Fields.

When they have the same Soil in their enclosed Grounds, they manure it with a light kind of Marle. If they should put a clayey Marle upon this Land, it would be only adding Stiffness to Stiffness; but they have a greyish Kind in that County, which crumbles after the least Rain, and this they use for these Purposes: with this dressing it will yield good Grass after eight or nine Crops.

Now tho' this Practice be not altogether the best that can be us'd, we see the Effect it takes; and therefore much may be gather'd from it.

They plow it four Times for Wheat. This, with the Effect of the Air breaks, and makes it loose and crumbly. The Rains then soak into it, instead of lying upon it, or running off without Benefit, and leave behind them the fine Earth they contain.

The same Purpose is forwarded also by their laying it in Ridges, because more of it is in that Situation exposed to the Air and Rain. After this, once plowing does for Beans, because the Earth is already improv'd by these repeated Plowings; and because Beans do not require so fine an Earth to cover them as Corn.

The Farmer seeing Things in this Light, will understand the Reasons of his Success, or Failure in every Article; and will be enabled to improve his Lands, and enrich himself, upon the Principles of Reason.

He will see the great Disadvantage of the com-

mon Field Management, and the great Benefit of the Dressing given in the Enclosures in the strongest Light. In the first Method every third Year is lost. Nor is that all, but they lose a great deal of the Advantage of the second Year: For in the other Way, a good Husbandman after his Crop of Beans, Pease, Oats, or Barley, has a Crop of Turneps or of Clover.

Instead of this great Loss, the enclosed Land of the same Kind manur'd with the grey Marle, yields eight or ten Years Crops successively; and at the End of the Plowing when it is laid, to gain fresh Heart, it yields good Grass, and no Time at all is lost. Nor is it really necessary to let it lie still at all, for if they keep marling it constantly, they may plow constantly: the Dressing supplying Nourishment for a new Crop, as soon as the old one has exhausted the former.

Upon the whole of what has been said of the Management of this, as well as the other clayey Soils, my Advice to the young Farmer is, that he consider if he have an enclosed Field of this Soil in his Hands, what Kind of Manure he can best command, and at least Expence: for this is a Consideration that will weigh against any other.

Let him begin by plowing deep and often; and let him lay up the Land in Ridges, observing to place the Ridges East and West, that the Sun may have fuller Effect on them.

If there be Marle in the Neighbourhood, let him examine whether it be fit for the improving of Clay in this Manner. First of all let him examine it in his Hand, if it be firm and heavy, it is not fit. The lighter always the better for this Purpose. Then let him throw a Piece of it into a Bowl of Water; if it begin presently to crumble to Pieces of itself, and in a short Time fall to a kind of Powder, it is fit for the Purpose; but if it continue in a Lump, and the Water have little Effect on it, 'tis not for his Use for this Kind of Soil. I shall speak more largely of Manures hereafter, so this may suffice for the present Occasion.

If he have a proper Marle at Hand, let him lay it on in Plenty for the first Dressing; and repeat it in moderate Quantities afterwards: If Marle of the right Sort be not in the Way, let him use Chalk. This does not take so quick an Effect, because it does not get into the Body of the Clay so soon, but the Expence and Labour are very well repaid, because the Benefit is as lasting nearly in this, as it is in the red clayey Soil.

If the first Manure be Marle, he may continue the same without any Addition; but if Chalk, he will do well to give the Assistance of other lighter Manures occasionally. Saw-dust, when it can be had in Quantities, is a very great Promoter of Fertility in this Land. It acts in the same Manner as the decay'd Stalks of Plants, than which nothing is richer.

In some Places where other Manure cannot be had, Sea Sand may be used for the Improvement of the yellow clayey Soil; and it is to be laid on in very large Quantities: this may seem strange Advice to the Farmer in some Counties, where such a Thing was never heard of, for every Thing appears strange at first; but it is



a Practice founded on Reason: the Cause of the particular Barrenness of these clayey Soils, is the Toughness of their Substance; and Sand breaks that Toughness, and gives Way for the Rains to get into their Body. Farther Loams are fruitful, as will be seen hereafter; and as the practical Farmer well knows Loams are only Mixtures of Clay and Sand. Nature has made the Mixture in these Places, and why may not Art and Industry imitate her.

By large dressings of Sand, a clayey Soil may be turn'd into a loamy one for ever; and then an Addition of such Manures as we shall afterwards order for Loams is useful. Nor is it a wonder that Sand should in this Manner meliorate Clay Ground; for Clay is us'd in the same Way as a Manure to Sand, of which more hereafter; and in that Case it does the same Thing.

Ashes which are a very good Manure for yellow clayey Lands, act in a double Way, both as Sand, and by their other Qualities; warming, as well as opening the Land: and after the more substantial Dressings, Soot is an excellent Manure. Nor is burning to be forgot for the Improvement either of this, or of the red clayey Soil, for it breaks their Parts in a surprizing Manner, rendering them not only fruitful in themselves, but converting them into a Manure for other Lands.



## CHAP. X.

### *Of yellow clayey Soils for Pasturage.*

I Have observ'd of the red clayey Soils, that they are very rich in Grass when they lie low, because they retain the Advantage brought them by Waters. But Experience shews this is not so much the Case in the yellow, for when they are in a low Situation, they are too damp for any good Produce.

The Reason of this I take to be, that their Substance is more compact than the red, and they do not let in that fine Earth which comes with Rain or otherwise, and which mellows and enriches the red clayey Soils in this Situation.

For a Proof of this I have observ'd upon examining, that the yellow clayey Soil contains less of the vegetable Earth in general in its Mixture than the red: that is, it comes nearer to entire Clay. A Piece of this Soil taken from under the Turf in a Pasture, is seldom richer than a Piece taken from a plow'd Ground of the same Soil. From these Observations, I believe, we may fairly judge, that the yellow clayey Soil is for the Generality, much poorer than the red. And this is the Reason Marle is so excellent a Manure for the yellow clayey Soil, because it dissolves into so fine a Substance, that it mixes with the Clay, and serves in the Place of that Earth, which Nature has deny'd in the Composition: breaking the tough Texture of the Soil, and letting in Rains.

But tho' low Grounds that have a yellow clayey Soil, do not usually produce so good Grass as those of a red: yet this Kind is upon an Equality with the other when it lies dry. This is Numb. II.

a very common Soil in the high Pastures in BEDFORDSHIRE, and the Grass is excellent.

As the Soil may be judged of in general by its natural Growth, so it may also with great Justice in particular Places. It is always a Mark of good Pasture Ground, that a great Quantity of Cowslips naturally grow there; and there is no Soil that produces so many or so strong as this: nor is it apt to be over-run with Weeds, except Thistles, which are known to be the natural Produce of all Soils that are clayey, and have a good Heart.

The Farmers in BEDFORDSHIRE observe, that it is always a good Pasture to feed Cows upon, where there are Abundance of Cowslips, and I have observ'd in many other Counties, that there is no Pasturage so well agrees with that Animal, as where the Ground is of this yellow clayey Kind.

The greatest Disadvantage of these Pastures, especially when they are on the Slope of a hilly Ground, is, they are apt to be moist in Winter. In WARWICKSHIRE they prevent this by digging many deep Trenches thro' them. These receive the wet and carry it off by Degrees, as may be known by the continual dribbling at their Openings. By this Means they keep the Pasture Ground, though of this Soil, sufficiently dry at all Seasons.

It is always good in Pastures to have a firm Bottom that will detain some Moisture; and this is one Reason why the Pastures on a yellow clayey Soil are good: for they have usually a pure yellow Clay for the under Layer, and that is one of the firmest of Earths.

A Pasture that has a yellow clayey Soil, and that lies high, will need frequent feeding or mending, whereas those in a lower Situation, are dress'd by Nature, as observ'd before: but then the Hay of the best low Lands, is not to be compar'd with that of these higher Grounds.

I have observ'd in many Instances, that the finest Hay I have ever seen, has come off of high Grounds, where there has been a yellow clayey Soil.

My Advice to the Farmer is, that he always examine the Earth in his Pasturage; and that he never fear to take an upland Pasture Ground, if this be the Soil; though it appear but in bad Heart: for he may be sure there is what is right at Bottom, and he may improve it at Pleasure.

In this, as all other Instances, I advise him not to spare Manure or Labour. The Money that is saved that Way is lost ten-fold.

The best Manure for the upland Pastures of this Soil, is Dung mix'd with Mud from the Bottoms of Rivers, or the cleanings of Ditches. He should lay on this at such a Time, that the Rain will wash its Richness in before the Sun evaporate it: and he cannot spread it too fine in such a Season.

The finest Manure of all for this Ground, when it can be had, is the Bottom of old Haystacks. There is always there a fine rich Mould; and the Quantity of Hayseed among it is no small Advantage; for it sows the Ground afresh, and comes up with all the Strength of the Manure.

In STAFFORDSHIRE, where the low Pastures are



are often of this Soil, they manure them with Marle, and it excellently answers their Purpose: for even where the Mud brought by the Overflowing of a River, would only lie upon the Surface to be baked by the Sun; the Marle will make its Way into the very Heart of the Soil.

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#### C H A P. XI.

##### *Of yellow-clayey Soils for Trees.*

**T**HIS is not a Soil in which Trees shoot quick, but there is a Soundness and Heart in it that gives them a great deal of Strength.

I have observ'd, that the Nature of this Soil approaches very nearly to entire Clay: and it is known by all Experience, that no Tree whatsoever thrives well in entire Clay. This is not the Soil therefore on which Plantations are to be made for the Advantage of the Wood.

There is also this Reason against the Farmer's planting on the yellow clayey Soil, that the Growth of the Tree is surprizingly slow. It is a Remark of Mr. EVELYN'S, That Trees growing on this Ground, require thrice the Time to come to their Stature: and this Experience confirms; for we see Trees keep many Years almost of the same Bigness on this Soil: and as for such as are large, it is hard to know when they were planted.

Neither is this yellow clayey Soil any fitter for the Orchard than the Forest. Fruit Trees grow as ill in it as Timber Trees: and it even alters the Quality of the Fruit. It is known by manifold Experience, that Apples of the same Kind have a quite different Flavour, when the Trees stand in a good light Soil, from what they have in this yellow Clay.

Another great Disadvantage of the yellow Clay for Fruit Trees is, that the Trees which grow in it are found to be much more liable to be over-run with Mofs, than those on better Soils: and every one who has at all consider'd the Products of the Orchard, knows how great a Disadvantage this Foulness is to Fruit Trees of all Kinds.

The Farmer therefore who has Land with this Soil on his Hands, knows from this what to expect from them. They will answer exceeding well with proper Care, in plowed Fields and Pasture: but he is to remember not to make Orchards or Plantations upon them.

If he see large Timber upon the Ground, particularly if it be Oak, he need not fear bargaining upon that Head, if it come within his Design; for 'tis more likely to be found than on any other. Oaks on this Soil are very tedious, but they are very firm.

This Soil is also fit enough for the raising Seedling Trees, which are to be transplanted to another. For, as they never thrive well when removed from a better Soil to a poorer: so they on the contrary succeed to Admiration, when they are taken from a Soil of this Kind into good Mould.

Thus we see from repeated Experience, that altho' the red and the yellow Clay agree in many Respects; yet there are several others in which

they are entirely different. And this is the Use of collecting Observations from different Places and Persons.

Altho' these two Soils are so like in many Respects, the two which follow, namely, the black and the white Clay differ from them almost in all. So that he who talks of a clayey Soil, unless he expresses the Colour, says nothing. In general, however, when that Expression, a clayey Soil is used without any farther Particulars, it means a red or a yellow.

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#### C H A P. XII.

##### *Of the white clayey Soil.*

**E**VELYN observes, that among Clays some are so obstinate, that nothing will subdue, and others so voracious, that nothing will satiate them. Of the first Kind are the two former, the red and yellow; of the other, the two succeeding, the white and black, but principally the white; the black in some Places approaching to the Nature of the others.

Now as I have shewn in what Manner the most stubborn of the former Kinds, may be subdued either for Tillage or Pasture: I shall here from the same Foundation of Experience, instruct the Farmer how he may satiate and fill these others, whose hungry Nature has seem'd to many not to be conquer'd.

It has been affirm'd by some practical Writers who have examin'd these Things nicely, that Clay contains about a fourth Part of fine Sand. HOUGHTON, among others, has affirm'd this, and brought the Proof of it from his own Experiments. But 'tis only of the red and yellow Clays this should be affirm'd. The white Clay contains none: nor would be difficult to produce the yellow Clay altogether pure from it. Indeed there always is some in the red, and this is a Reason why the red clayey Soil is not quite so stubborn as the yellow.

It is strange, that among Soils of the same Name, contrary Methods are to be used in the Culture; but this is the Case between the red and yellow clayey Soils, and the white: it is to be observ'd, however, as before hinted, that these really agree in nothing but the Name of Clay, their Qualities being altogether different.

The Farmer is to observe an exact contrary Conduct with the white clayey Soil, from that proper for those before-mention'd; for his Aim is to be just opposite: his Care with the others is to make them fine enough: but when he has a white clayey Soil to manage, he must take Care he does not make it too fine.

As the red and yellow clayey Soils are tough and stiff; the white is tender and brittle: it breaks as it falls from the Plow: and from its Nature in this Respect, it yields to the Plow with great Ease.

Frequent Plowings were order'd for the others, but a few do for this. As no Soil requires so much Care in the Manures, the Farmer's Attention is to be employ'd almost entirely on that Head. In general, as the yellow and red clayey Soils



Soils require strong, this white one requires rich Dressings.

In the first Place, the finest Manure for it is Soot. This they practise in HERTFORDSHIRE, where they have much of this Land, with great Success: and had Mr. EVELYN, who says nothing will satiate these voracious Clays, seen the Effect of this Manure, he would have alter'd the Expression.

Soot may seem at first Sight a dear Manure; but a little of it goes a great way. Experience shews that one Bushel of Soot is equal in its Effects to a Load of common Dung.

Eighteen Bushels of good Soot will compleatly dress an Acre of the white clayey Land; and the same Quantity of Ground, as is very well known, will take as many Cart Loads or more of good Dung. But let the Farmer take Care he is not imposed upon in this LONDON Commodity: For the Chimney Sweepers are apt to mix Ashes among their Soot to encrease the Quantity; and then it may require five and twenty Bushels to an Acre.

The only way is to deal with reputable Persons: and, to speak from Experience, I have found Mr. FAT of Castle-street, who is the King's Sweeper, one that never imposed upon the Farmer; nor let his Servants impose upon him.

After Soot, the next Manure for this Soil is Dung. And in this Respect, the Farmer will find that the Practice of folding upon it is excellent. ELLIS recommends the folding first; and afterwards spreading it all over with the Dung: and this is found to be of great Service.

Turf and Dung also suit excellently well with this white clayey Soil: but they should lie to be mellow'd together for a great while.

The white clayey Soil when dress'd in this Manner, never fails to yield very large Crops. I have very seldom known the Price of Manure not answer when it has been of a proper Kind; but there is none that brings home the Money so sure, as that which is bestow'd on a Soil of this Kind: for it is but indifferent Land in its own Nature, but with this Culture it scarce yields to any.

This is not a common, nor a profitable Pasture Soil, nor for the Growth of Trees. I shall not, therefore, treat of it in distinct Chapters under those Heads; but proceed to the next and last of the Clay Kinds.

### CHAP. XIII.

#### *Of the black clayey Soil.*

HAVING consider'd the red, yellow, and white clayey Soils, I come now to the black, which is the richest of them all.

The other Kinds may be brought to Fertility by Art, and with Experience, but this enjoys from Nature the same Advantages. The Mixture in this Soil is so happy, that it is in its own native State, much like what they are when improved by Culture. Yet even this is capable of great Improvement, insomuch that it will

yield twice the Produce in the Hands of the skilful and industrious, that it does to the inconsiderate or ignorant.

This black clayey Soil consists like the others of a blackish Clay, which is mix'd with a Quantity of vegetable Mould; and also contains Sand, sometimes in a very large, usually in a moderate Quantity.

The Clay in the Composition of this, is not so tough as that of the red or yellow, as appears when they are examin'd singly; nor yet is it so short and crumbly as the white. Thus its own Nature tends to its making a better Soil than either; and then the Sand which it contains answers the Purpose of that which in other Cases is to be added; and the Quantity of vegetable Mould gives it great Fertility.

Such is the Composition of this excellent Soil; which is in respect to its Structure and Consistence, of a middle Nature between the white clayey Soil, and the yellow or red; and exceeds them both in Fruitfulness.

This Soil therefore does not require those painful or repeated Plowings, nor that Expence and Tedioufness of Manure which are necessary to the others: but light Turnings and rich Manures applied in small Quantities, answer the Purpose. These must be used according to Knowledge, and as there is no Land so well worth the studying as this, there is none that will so well reward the Pains.

The Varieties of this Land are called in different Parts of ENGLAND by different Names. In HERTFORDSHIRE, where they are more careful about the Culture of their Land than the naming it, they are all called by one Term black Clay; and the same Methods are taken with them.

In HUNTINGTONSHIRE they have three Kinds of them, to which they give different Names; they call one White Land, another Black Land, and the third Wood Land.

One would think by the Name White Land, this Kind belong'd to another Place: but, in Reality, it has little Title to the Name, it is very nearly allied to their Black Land. When wet, this looks as dark as that does; and when dry, the black itself becomes greyish. The greatest Difference in Colour is when both are thoroughly wet, and new turn'd up with the Plow. What they call White Land appears then greyish; and the other very dark: but they differ more essentially in their Natures.

The Black Land is more clayey than the other, and consequently requires more Manure; and is much inferior to the black clayey Soil in other Counties. It sticks to the Plow when plow'd in a wet Season, and has all the Marks of a clayey Soil. They manure this with Marle; and where that is not to be had with Chalk.

This may be an Instruction to the Farmer, to distinguish one clayey Soil of a blackish Hue from another; and to treat the worse Kind properly when he meets with it.

The White Land of this and the neighbouring Counties, for it is common in them, and called by the same Name, is truly of the black clayey Kind, it is dark enough when wet, and falls off the Plow-share easily, breaking into small Clods.



Clods. This is a very rich Land; and is to be treated as the best Sort of this Soil.

The Wood Land of this County is nearer the ordinary black clayey Soil of HERTFORDSHIRE, and other Places, than any other. I have already named a Soil called Wood Land in some Parts of NORTHAMPTONSHIRE, which is rather of the Nature of the red clayey Soils: but they have also in that County a kind of Wood Land, in particular about PYCHELY, which is truly of the Nature of the HUNTINGTONSHIRE Wood Land, and as rich. They have also the black and white Lands, and they call them by the same Names.

Having thus explain'd what is meant by the different Names under which the black clayey Soil is express'd in different Places, I come to treat of its general Nature, which is soft, mellow and crumbly; breaking in the least Frost.

This Soil is richer in HERTFORDSHIRE than in any other Part of ENGLAND I have seen: it is there pure and unmixed. On the contrary in NORTHAMPTONSHIRE, it is always somewhat stoney; but then the Stones are small; and they are of Use rather than Detriment, especially where this Soil is not of the firmest Kind, for they break and open it, giving Room for the Rains, and for the Shooting of the Seed.

Too much wet is an Enemy to this Land; therefore those Fields which have this Soil, and lie somewhat high, are the most profitable: but the Generality of it is found in lower Places.

This Soil neither requires so much Plowing as the red and yellow Kinds: nor will it do with so little as the white. Moderate Plowing is best: but when it lies low, I would advise the Farmer to plow it with a Foot Plow, only one Way, in broad Lands, laying it in half Acre Pieces as high as may be, for this is the Way to avoid the Hurt that will ensue from its being too wet; as it is very apt to be in these low Grounds.

The Farmer who should go to dress this Soil like the other clayey Kinds, with Chalk and Sand, and the like, would be guilty of a strange Error. Mellow Dung is the proper Manure for this Land; and adds to its natural Richness. Cow Dung is not amiss for it, but the best Manure of all is the Dung of Pigeons. Where this is to be had, the Way of using it is thus. It is to be sprinkled over a Barley Field for Instance by Hand, as soon as the Barley is sown. In this Case the Rains wash it in, and the Effect of it is surprizing. Nothing can exceed the Crop that follows such Dressing on such Land.

The Dung of Poultry is also good used in the same Way; and any rich and mellow Manure.

This black clayey Soil in Pasture Land is very fruitful, and needs less dressing than any other; the best Manure is Dung, that has lain till it is well rotted: this is to be carefully spread over the Ground, that the Rain may wash it in: and for this Purpose it should be laid on in a rainy Season.

Trees of many Kinds prosper very well in this Soil; and no where better than in NORTHAMPTONSHIRE, where not only the Soil itself; but the thick Bed of Clay that lies under it, is intermixed with small Stones.

When the Clay at bottom is more pure, it is

liable to the Objections of being too close, and holding the wet, which chills the Roots of some Trees to their Destruction: but when there are these Stones among it, they make it in some Measure loose, that it lets the Water drain out; and gives Passage to the small Roots.



#### C H A P. XIV.

##### *Of loamey Soils.*

**T**REATING of the clayey Soils, we have led the practical Farmer thro' a great Variety of Kinds; each of which it was of the greatest Importance to him to understand. There remain yet five other Sorts of Soil to be treated of. But these will be comprehended in a smaller Compass, none of them having that Variety.

Among these those of the loamy Class naturally follow the Clays, because they in a great Degree partake of the same Substances, altho' from the Proportions of the Mixture, they differ in their Nature.

We have seen that a clayey Soil is no other than Clay mixed with some Quantity of vegetable Mould.

Loam is a Mixture of Clay and Sand: the Sand being in a large Proportion.

A loamy Soil therefore, is a Mixture of Clay, Sand, and some vegetable Earth: or it is a Loam, such as before described, with some vegetable Earth among it.

We have seen that in what are called clayey Soils, there is usually a little Sand, but this need not make Confusion. The Character of Loam is, that there is a great deal of Sand mixed with the Clay; and there is also in these Soils usually a great Quantity of Earth.

The loamy Soils are more common than any other: they differ in Colour according to the Clays, and the Earths of which they are compos'd; and they differ also in Richness and Fertility, according to the Quantity of vegetable Earth in the Composition. Even pure Loam is not unfit for Use, for the Sand opens and breaks the Clay, so as to render it fit for Vegetation; as we see in those Places where Sand is us'd upon Clay Grounds, by way of Manure; but when a considerable Quantity of vegetable Earth is added to this Mixture, it becomes very fit for the Product of Herbage; the Clay serving to give it a Body, and keep the other Ingredients from mouldering into Powder.

Loamy Soils are of all others the most natural, because these Mixtures of different Earths together, are what may be expected every where: and they agree with almost all Kinds of Growths, because they are of a middle Nature, and in some Degree partake of all Soils.

They have for this Reason been in general called by some natural Soil, and by others mother Earth. As all Plants receive their Nourishment from the Earth; according as that Earth is suited to them, they thrive more or less: now, tho' a loamy Soil will naturally support almost any Produce of the Ground, yet all will not thrive alike in it. The Art of the Husbandman therefore must be employ'd by proper Manures to suit



suit the loamy Soil in his Hands to that particular Crop he desires should grow upon it; and this may be done effectually.

We see by Experience, that Clay and clayey Grounds keep in the Seed a long Time, and push it slowly; on the contrary, sandy Soils make it shoot at once, and forward it hastily. The same Seed sown in Clay and Sand, shall be a Month earlier in the shoot in the latter than the former. We see also, that this Backwardness of the Soil, and this over-hastening Quality, are both attended with bad Consequences: and it follows, that loamy Soils must be very valuable as they partake of each, and are in their Composition, and also in their Effects, of a middle Nature between both.

We see that loamy Soils are suited to universal Use, in that all Kind of wild Plants grow in them. There are some Plants which grow naturally in Clay, and others which live in sandy Soils. Now the Plants which are Natives of the Clay, will not live in the Sand; nor will those of the Sand live in Clay: but both will live and thrive in Loam.

From this and many other Observations, we see that the loamy Soil is universal; and that all Sorts of Plants will grow in it. This must greatly encourage the Farmer who has it in his Fields, but this is not to lead him to think it will do without his Industry. There is Difference between growing and thriving. Things must not only live but thrive with the Farmer, and to this Purpose he must assist and improve his Land when this is the Soil. 'Tis a Comfort that Nature has laid a Foundation; but the rest must come from his Industry.

Loamy Soils have many different Appearances. Some call the under-turf Earth, Loam, let it be of what Nature it will, and then the Variety is endless; but without that Mistake, the Kinds are very numerous.

In HERTFORDSHIRE, and the adjoining Counties, they distinguish these Soils into five Kinds. These are Clay Loams, Sandy Loams, Gravelly Loams, Stony Loams, and Chalkey Loams: what they mean by these Terms is as follows.

The Clay Loam is a loamy Soil in which there is an over Proportion of the Clay to the rest of the Ingredients; for these Soils, as said before, are all of a very mixed Kind. The sandy Loam is a loamy Soil, in which the Sand is in too great a Quantity: the gravelly Loam is a loamy Soil, with small Pebbles among it; and so of the other two, the one having Stones, the other chalkey Matter among it.

The Farmer is to consider each of these as a loamy Soil in the general Dressing; but he is to alter that a little in each also; by adding what is elsewhere described as useful for improving that particular Soil, which is over-proportion'd in the Loam. For Instance, if it be a clayey Loam, he is to add to the usual Dressings for loamy Soils, a Quantity of Sand. This will make up the natural Deficiency. And in the like Manner he is to manage the others.

In many Parts of NORTHAMPTONSHIRE, particularly about OUNDLE, they have a Sort of Earth which they call Lamb Earth. This is a

N<sup>o</sup> 2.

loamy Soil, and I believe the Name Lamb Earth is only a foolish way of speaking Loam Earth. It is a Loam with a great Quantity of stony Matter among it. This would have been called a stony Loam in HERTFORDSHIRE, as shewn already: although it differs in many Respects, from all the Earths in that County.

It is hard and whitish, and beside the Bits of Stone that are in it, 'tis full of broken Sea Shells. In some Places it is the under-turf Soil, and in others it lies beneath that. When it is uppermost, they dress it with Dung, and the Mud out of Ditches: where it lies under the Soil, they plow deep to turn it up among that; and breaking by Degrees with the Sun and Rain, it serves as an excellent Manure to the rest.

In KENT they dress their clayey Loams with Chalk; and this is found by Experience, to be an excellent Method. I have myself examin'd many of the Lands that have been for some Years dress'd at proper Times in this Manner; and have found that the Chalk in time mellows down into the clayey Matter, so as to make in the whole a kind of Marle.

I have seen Lands there not only made very fruitful in themselves by this Practice, but the Soil of them might have been us'd as Manure for others.

We see that among the Clays some are so tough, they will not receive Manure, others so hungry, they hardly ever are satiated; and Sand which takes it readily, yet lets it go again so soon, that the Farmer has not the Advantage of his Expence or Labour: but loamy Soils have none of these Inconveniencies. In the first Place, they are in themselves fruitful: then they are loose enough in their Texture to let in Manure; and have Firmness enough to keep it.

In short, a loamy Soil, where it is not from its Situation too dry or too wet, is an Estate to the intelligent and industrious Farmer.

With Respect to the Manner of its Dressings, he is more to regard the Texture of the Soil, than its Colour: which last may be various, while the Substance is in a Manner the same.

If it be a clayey Loam, that is, a loamy Soil with too much of the Clay, let it be well plow'd, and broke thoroughly: then dress it with a Mixture of burnt Turf from a Heath, mixed with Lime and Hog's Dung. This Receipt I obtain'd from a Farmer in OXFORDSHIRE, who kept it as a Secret, and was envy'd by all his Neighbours. In BUCKINGHAMSHIRE they dress the same Soil with a Mixture of Cow Dung, sharp Sand, and Ashes of Fuzzes from the Commons, and I have seen it succeed well, but not equal to the former Method.

When the loamy Soil is too sandy, Clay may be us'd as a Manure; and at other Times River Mud mix'd with Dung and rotted Turfs: this also I have seen practis'd very successfully.

When the loamy Soil is in its own Nature well mix'd, and no Ingredient over-bears the rest, Dung in the common Way of using serves to refresh it after it has been exhausted by Crops: and as the Effect of this is but short, the experienced Farmers plow in Horn-shavings bought in LONDON, together with Hoofs and Skins of any Animals. These not only give great



great Strength and Heart to the Land, but  
their Effect is very lasting.

When there is too much Earth in the loamy Soil, the best of all Manures is Soot. This laid on in a moderate Quantity, gives that Soil the only Thing it wants, which is Warmth. This Sort of Land receives the Manure kindly, and requires moderate plowing.

When the loamy Soil has Stones in Abundance, whether they be of the Lime Stone or Pebble Kinds. And whether it be called a gravelly or a stoney Loam, the vegetable Earth being deficient, good mellow dunging is the Way. In this Case, I advise the Farmer to bring out all the Dung from his Yard, Horse Dung, Hog, Cow, and Poultry Dung, and mixing it with Mud from the Bottoms of Rivers or cleansings of Ditches, make it into a Heap in the Field. When he has a good Hill of this Mixture, let him cover it with fresh cut Turf, and leave it to mellow together.

When he is to spread this on the Ground, let him take a fit Season: not lay it on in the midst of Summer, for the Sun or Air to waste its Strength, but toward Autumn, when the succeeding Rains will wash it into the Ground. Thus will he make a Soil that is but unfruitful in itself, very rich; for these poor stony Loams, tho' barren in their own Nature, receive the Dressings kindly, and are thus made very fruitful.

In some Parts of SURRY, they have a very stiff clayey Loam, which they treat as follows. After a Fallow they sow two Crops; and lay down their Lands with Clover for three Years. At the End of this Time they dung it richly, and then it is fertile for several Years again.

In HERTFORDSHIRE they plow in Clover alone, or with Dung; and some sow and plow in Buck Wheat; both which Methods have their Advantage, but they are not comparable to several of those before mention'd.

I have treated the more largely of the loamy Soil, because it is the most frequent, and is very various in its Kinds. . Nothing concerns the Farmer so highly, as to understand its several Natures, and the proper Management for each ; which I have deliver'd from the Experience of several Persons in different Counties, selecting from a great Quantity of Observations in this Way, what seems to be confirmed by the most frequent Trials. Loam is thus made to suit all Sorts of Crops ; and is in its own Nature, very friendly to Grass and Trees of all Kinds.

## CHAP. XV.

### *Of sandy Soils.*

**T**HERE are some Parts of this Kingdom in which the Covering of the Earth is for large Tracts together a bare Sand. These are barren, for not only the Winds disturb the Surface continually, and prevent the rooting of Plants (except a few stubborn Weeds that will grow in dry Sand, as others will on naked Rocks) but Sand alone can afford very little

Nourishment to them : at the same Time that  
it burns up their Roots.

This Sand where it is thus the uppermost Covering of the Earth, must be called the Soil in those Places; but this is not what the Farmer is to understand in general by a sandy Soil. When we speak practically, we mean by that Name a Soil in which Sand is predominant, altho' there be several other Earths in the Mixture. From this great Quantity of Sand, these Soils are all loose and crumbly. This is the great Article of their Distinction: for that Soil I have already described, under the Name of a sandy Loam, is not called a sandy but a loamy Soil, because the Clay that is in it, notwithstanding the great Quantity of Sand, holds it together so that it is not crumbly or loose.

The sandy Soils are in the same Manner as those of other Kinds, distinguish'd into several Sorts according to their Colours. The three principal are the red, the yellow, and the white sandy Soil. There is also a brown, but this is less regarded, and is very barren. It is most common on Heaths, and consists almost entirely of Sand alone; the Sand which composes it is white, but it gets this brown Cast from a barren brownish Mould, which lies under the Heath and Furze Roots.

The other Kinds have their Colours mostly from the Sand in their Composition, the three principal Colours of Sand being red, yellow, and white: but sometimes the Earths in their Composition, prevail in Colour.

Beside the sandy Soils called by that Name, there are others known by various Denominations in different Counties. As for Instance, what are called red Land, and creachy Land in NORTHAMPTONSHIRE, are both sandy Soils; and so is the chifely Land, of the same County, tho' some call it a Loam.

To these is to be added, what in **BUCKINGHAMSHIRE** they call the black sandy Soil, and in **HERTFORDSHIRE** the black Sand. This might have been comprehended under the general Head already mentioned of sandy Soils, to which the other Ingredients give the Colour; for it is not a black Sand that is the principal Ingredient in this Soil, but the Mould amongst it gives the black Colour to the whole, though the Sand be whitish. I have, however, named this Kind separately, because it is much spoken of in some Places.

The sandy Soils in general are of their own Nature barren; but they are capable of great Improvement in the Hands of the judicious Farmer. Any Crop whatsoever will be sooner burnt up in this than in any other Soil whatever naturally; but with proper Dressing it supports them very well; this the industrious Farmer finds to his joyful Experience.

As these Soils are dryer, so they are warmer than any other: and very happily for the Husbandman, they keep their good Qualities after the Dressing, though they part with their bad ones. Thus the natural good Quality of sandy Soils, is to push any Crop very forward, but then their natural bad Quality is, that they soon after suffer it to be burnt up: now after due Dressings, they will preserve their Crop, as already observed,



served, as well as other Lands; but at the same Time they keep their natural forcing Quality so well under all these Dressings, that the Farmer if he manage well, may have two or three Crops from them in a Year.

Another Advantage of sandy Soils is this, that of all others they are the least productive of Weeds: and what they have on them are in general of the smaller Kinds; and easily destroyed. We see all Soils that are at all fit for Culture, have their Advantages peculiar to themselves; and there is none of them, but with due Management, will prove advantageous.

It is a farther Advantage of this Land, that it works easily under the Instruments of Husbandry of all Kinds, and freely receives Dressings. The redish sandy Soils generally require most Manure, the black least; the other two are in general about on an Equality.

No Soils receive Moisture so readily as sandy ones, but they are the least the better for it of any, because as they easily let it in, so they freely let it out again. The Rains that fall on clayey Soils, frequently do not penetrate into them; and those that moisten the sandy, do not stay in them; unless there be a firm Layer underneath.

The most common Layer under a sandy Soil, is stony or gravelly, and this lets the Water thro' as fast as the Sand itself; so that the Farmer's Trust must be in his Manure, to give a Firmness and Body to the Soil, that it may of itself retain Moisture enough for the Service of the Crop.

The creachy Soil in HUNTINGTON and NORTHAMPTONSHIRE, which is one of the blackish Kinds, and is full of Pieces of Stone, and Bits of Sea Shells, as before observ'd, is manur'd with Dung well rotted. And to this the most expert Farmers add Mud from the Ditches, or they cut good Turfs, and put them to rot among the Dung, and spread all together before Rains.

The red Land of the same Counties, owes its Colour to a redish Sand, of which it is principally compos'd. There is a Mixture of very fine Earth with it, but there are also Lumps of concreted Sand, which they call Sand Stones: these when they break with the Rains, and Tillage debase it, while the Farmer is improving it by his Manure. In some Places the vegetable Earth is mixed with the Sand in a moderate Quantity, in some others, as about HALSTON, 'tis almost entire Sand.

The Farmer in general may learn from the Practice of these Counties, how he is to treat such Soils. Where the Soil is poorest in this Kind, it is generally deepest: and as it works easily, they plow it deep, and bury in it old Rags, and the Skins of Animals with their Hoofs, and any other such warm Matter; after this they spread their Dung, first mixing with it Mud out of the Ditches. Thus they give it Warmth at the Heart, and at the same Time a Body and Richness nearer the Surface.

When this Land is so very sandy, I shou'd advise the Dressing it with Clay. This wou'd make it a loamy Soil. We know the Value of those Soils, and we know they consist of Sand,

Mould, and Clay. Here are the Sand, and more or less Mould ready, there wants only the Clay; which will freely enough incorporate with it, and make it sufficiently firm.

The chifely Land, as they call it in our midland Counties, altho' some account it a loamy, is more truly a sandy Soil. It breaks as it falls from the Plow; and moulders with the least Frost: so that it has little of a clayey or loamy Nature. In dry Summers also it is always a Powder. This is far from one of the worst of the sandy Soils. They dress it with Dung alone, and it yields excellent Crops.

Upon the whole, I should propose a Mixture of Soils for all these sandy Lands. They want Body or Firmness; and this may be given them by Clay, or by richer Earths, spread over them by way of Manure. This would be following Nature's Course, and mixing up Ingredients as she does. This Method might be called making, rather than improving a Soil.

The sandy Soils in a wet Season, prosper greatly with Wheat, Barley, or Oats: but as this Success depends on the Weather, the Husbandman who runs the Hazard, unless he have very well improved them, must take his Chance. The finest and best tasted Turneps are those which grow on these Soils. And they are not only well flavour'd but sound: Worms and other Insects which destroy them, love a moist Earth where they can burrow, and lie at ease: they are burnt up in these Soils.

Potatoes are very successful in sandy Soils; and it is well known that none are so fit for Carrots: Pease, Vetches, and Lentils, also thrive in these Soils exceedingly. And so do the foreign Grasses, Saintfoin and Lucerne, which are Natives of warmer and drier Countries than ours.

In the great Respect of Corn, as before observed, the Farmer's Success will altogether depend upon his Industry; for, though no Soils stand more in need of Improvement, they never fail to return the Expence bestowed on them tenfold.

For Pasture Grounds, a sandy Soil succeeds in Proportion to the Degree of vegetable Earth that is among it: the poor red Land of ROWELL, and other Places in NORTHAMPTONSHIRE, yields very sweet Grass; but not a great deal of it, except in Proportion as it is improved by Manures: but when there is a due Mixture of Earth, and the Farmer adds his Dressings of rich Dung, Mud, and the like, none succeeds more to his Expectations. I believe some of the finest Pastures in the World, are to be seen in OXFORDSHIRE, and the Soil is generally a yellow sandy one, but with a good large Proportion of vegetable Earth; and the Farmers keep it warm by frequent Dressings.

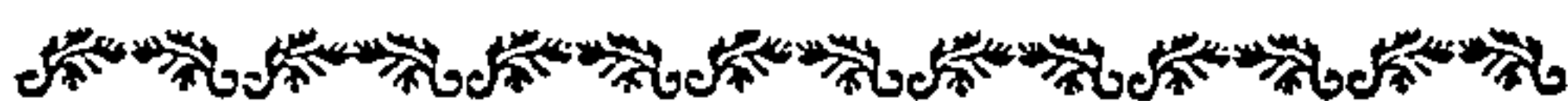
In WORCESTERSHIRE they have this Soil frequent in Pasture Grounds, and on opening the Earth, there is found to be a Layer of Gravel underneath. They have sweet and fine Grass here, and it grows moderately full; but in dry Seasons it burns up: however, it quickly recovers itself on the least Rain. They dress it here with Dung in a coarse Way: if they were more careful in that Respect, they would have a much larger Produce.

In



IN LANCASHIRE they have a sandy Soil of a particular Kind; they call it Foxglove Earth. It is a tender brown Soil, full of a sharp Sand, and with little other Mixture than a fine vegetable Mould. This affords them very good Pastures. In general the Grass is sweetest that grows on these Soils.

With respect of Trees, the sandy Soil is not greatly to be prais'd for the larger Growths. The Beech succeeds best in it. And the Hazel, the Holly, and some others of the Shrub Class, will hardly thrive in any other; for the rest it wants Body. There is neither Firmness in it to give good Hold to their Roots, Richness to supply them with Nourishment, nor Closeness to hold Water. It may be proper enough to raise Seedlings which are to be transplanted to richer Soils; but otherwise it is of little Use in that Way.



## CHAP. XVI.

### *Of gravelly and stony Soils.*

IN this, as in the foregoing Chapters, it is necessary to premise, that there is a great Difference between what is called a gravelly Soil, and a Bed of Gravel.

Gravel is very frequent at small Depths in the Earth, and sometimes it is seen in the same Manner at the Surface: that is, naked, and without any Mixture of Earth. What is called Gravel, is a Cluster or Quantity of Flints and Pebbles. These, when they happen to make the upper Surface of the Earth, lie in the Place of a Soil, tho' they cannot be called a Soil properly. They can afford no Nourishment for Plants, nor do any grow wild among them, except upon the Sea Shore some few that have Roots so long they penetrate into the Ground underneath, thro' a Foot or two Depth of these loose Stones.

Such a Covering of the Earth therefore, compos'd of Numbers of Flints and Pebbles alone, is Gravel: but, as in the former Cases, a gravelly Soil is a Composition of Mould, Sand, Clay, or some other Substance with this Gravel.

The Soil thus compos'd, is distinguish'd into several Kinds, according to the Nature of the Earthy, or other Matter that is mixed with it; and hence the Farmers name these different Kinds, clayey Gravels, loamy Gravels, or sandy Gravels: they might add another Sort to be called marly Gravels; for I have observ'd in HUNTINGDONSHIRE, a Soil compos'd of a sandy Marle and Gravel, with no other Admixture. This turn'd to little Account in the Hand of the Farmer who rented the Land, for he did not know how to dress it. The Rains wash'd down the Marle to the Bottom of the Bed, within a few Weeks after every Plowing, and the Gravel remain'd in a Manner naked; but I am convinced had he dress'd this Land with a clayey Loam by way of Manure, it would have given it a Body: the Marle would have blended with the Dressing; and they would together have made a Bed capable to hold the Pebbles. Thus a new Kind of Soil would have been made, not

unlike what they call a stony Loam in some Counties, which I have seen very fruitful.

I give this Advice to the Farmer, who shall have a gravelly Soil of this Kind upon his Hands, from Reason and Opinion, not from Experience, or any Thing I have seen; but I do not question it would prove successful.

As these Soils consist of Gravel and earthy Matter, they are in general better or worse, as that earthy Part is in a greater or lesser Proportion. There is something in the Kind of Earth, but the Gravel is in itself so entirely barren, that the great Article of Difference lies in the Proportion.

When gravelly Soils are very poor, it is almost vain to try to improve them. When they have any tolerable Mixture of Mould, it will help to detain the Manure, be it what it will; but when there is very little, the Dressings be what they will, wash through them. The Farmers are in many Places so sensible of this, that they let such Lands lie idle.

In some Places the Gravel in these Soils, consists wholly of smooth round Pebbles, and in others there is a Mixture of irregular Stones among them. In many Places also, there are Lands in which the Soil is compos'd altogether of these irregular Stones and Mould, without a single Pebble or Flint among them. Through Carelessness this is called also a gravelly Soil, tho' it ought to be called a stony Soil, these stony Lumps being broken Pieces of Lime Stone, or other rocky Stones.

This is a much better Soil than the other, because there is a Warmth in the Nature of Lime Stone; and because being of an uneven Shape, they mix better with the Mould, and remain more firmly in it than the Pebbles, whose Roundness and Smoothness makes them liable to fall out continually.

The Soil called in BEDFORDSHIRE, and the neighbouring Counties, kealy Land, is of this Kind; and it is tolerably fertile. Barley succeeds very well upon it. They manure it with common Dung, and it receives and retains that Dressing very well, always keeping its Condition tho' very full of Stones.

The clayey Gravels are a tough and disagreeable Soil. The Pebbles break the Substance of the Clay, and give way for the Rains to come in, and for the Roots of Plants to penetrate, but there wants a Mixture of Earth for the Foundation and Support of the Growth.

These are best manur'd with Marle, but a right Kind is to be chosen. It must be the light brittle Marle that moulders to Powder in Water. The larger Stones should be pick'd off these Lands, and this Dressing repeated at convenient Times, and with this Assistance few Soils exceed it in Fertility.

Loamy Gravels are in their Nature preferable greatly to the former; they are a Mixture of Clay, Sand, fine Earth, and Pebbles: the larger Stones are to be pick'd off from these, and the Land is to be dress'd in the same Manner as the poorer Sort of loamy Soils, as has been shown already.

The sandy Gravels when they are best, are but very indifferent Soils, that is, when there



is the greatest Proportion of the fine Earth mixed with the Sand and the Pebbles; but when they are poor in their Kind, they are hardly worth cultivating, for the Rain washes the Sand down among the Pebbles, and the Manure with it; and the Soil gets into the Condition of a native and naked Gravel, such as has been before mention'd.

If the Farmer have such Land upon his Hands, or chuse to meddle with it, he must propose to be at a great deal of Expence, before he can expect any considerable Return. The only reasonable Way of going about an Improvement, is first to make a Loam of it, and then to enrich it with Dung and other Materials.

This is the View he must have in his Work, and to this Purpose he must begin by dressing it with Clay. This he must take Care to incorporate well with the Sand and Pebbles, and when he has made it as it were a different Soil by these Means, he must dung it well, for now it will hold the Manure; or if Marle can be had, that will be an excellent Dressing.

By this Means he will bring it to be fruitful, but this is a Work of Time, and by his Labour, he rather makes a new Soil than improves the former.

In OXFORDSHIRE they have sandy Gravels with a very small Mixture of Earth, so that they hardly stand the Effect of heavy Showers, which make them often look at the Top like a bare Gravel.

When the OXFORDSHIRE Farmer undertakes a Piece of Ground of this Kind, if he find it in this naked Condition, and without so much as Grass upon it; the first Thing he does, he folds his Sheep upon it in Winter, and sprinkles it with Hay-feed among the Dung. If the folding be not sufficient, he adds some fresh Dung, or old Straw or Thatch: or sometimes without folding at all, he spreads some common Dung, or the Bottom of an old Hay-stack: in this latter Case, he trusts to the Hay-feed that is fallen from the Stack, but if it be only Dung, he uses to sprinkle Hay-feed with it, that there may be Grass as well as Nourishment for it.

They always find that if these Sort of Lands have no Sward upon them before they are fallow'd, they will bear a great Quantity of Weeds, but a very slender Crop of Corn.

They fallow in Autumn or Winter as the Sward directs them. If it be a Winter following, they never stir it again till they plow it up to sow it with Barley, and Experience shews, as I have frequently seen, that this Practice does better than finer Tilling. After this they must be kept well in Heart with Manure, but if that be done, they yield good Crops. When worn out, they lay them down with Clover or Ray Grass. In some Places they fallow them every other Year, except they sow Pease upon them.

If instead of finding this Land bare, the Farmer sees it full of Weeds, he begins with fallowing it at once, and afterwards proceeds as before.

I don't give these as the best Methods: but I have seen them practis'd with Success. However, I think those before laid down, as they are founded upon better Principles in Reason;

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and confirm'd in the same Manner by Tryals, deserve the greatest Regard. In short, the Business with a gravelly Soil, where it is poor, naked, and hungry, is to give it Earth, and take Care afterwards when a Soil is in this Manner made, to improve it by enriching Manure; in the same Manner as if Nature had done the rest.

In BEDFORDSHIRE, where they have some clayey Gravels, they dress them in a Way different from all those hitherto named. Their Manure is Chalk, and they blend this well with the Soil by frequent Plowings. Experience shews this to be no bad Method, and upon a fair Comparison between the Crops of these Lands, and of those of a like Nature dress'd with Marle, the Difference appears to be, that the Effect of the Marle is greater at first, but that of the Chalk is more lasting. The Farmer therefore who has both these Kinds of Dressings in his Power, is to be guided in the Choice by his own Circumstances.

They have an Opinion, that the Effect of Chalk, tho' it lasts so long, yet is fatal to the Land in the End; but this is a Mistake. It is owing either to their not seeing far enough before them; or to their Ignorance of a proper Management at the End of the Time.

It is true, that the Strength which Chalk gives to a clayey Gravel, tho' it lasts a great while, does not hold for ever: but is this a wonder! To be sure, Land dress'd any way will wear out at last, but when it comes to this, let it be laid down for Clover or Ray Grass; and proceed as before directed.

The Farmers seeing the Effect of Chalk so great, think it will hold for ever, and their own Folly is the Cause of the Complaint.

In general, the gravelly Soils need less plowing than many others. Those of the clayey Kind, demand more than the rest; the sandy very little. They are all forward Soils: but in different Degrees according to their Natures: the sandy Gravel pushes the Growth as much as any whatsoever. It requires a great deal of Care in Dressing; but when that is done, it answers very well: it is a light sweet Soil, and is hurt by much plowing.

The expensive warm Dressings brought from LONDON, such as Horn-shavings, Coneyclipings, and the like, lie a great while in these Soils, and continue their Efficacy. On the other hand, the folding of Sheep on them takes the quickest Effect, but it is the soonest exhausted. The Farmer who attends to this, will see that there is no giving a general Advice on this Head, but that he must consider his own Situation, as well as the Condition of the Soil. One Manure may be proper if he be like to hold the Land a great while, another if his Time be uncertain: for there is no Occasion that he should be at a great Expence, for his Successor to reap the Profit; as often happens.

Where the Gravel is sandy and with a little Clay, the best Dressing of all others is pure soft Mud from the cleaning of Ditches: when the Clay is in a greater Proportion, Marle is better; and when yet more then Chalk is to be used as laid before. Let not any one say I here repeat what



what is said before. The Circumstances vary by small Degrees. I would give the practical Farmer Advice in all: and I had rather be superfluous than deficient.

In fine, the Fruitfulness of a gravelly Soil of any of these Kinds, when rightly manag'd, is surprizing. Few Lands produce better Crops of Wheat, and it is a strange Sight to see the Corn growing so thick, where there seems to be nothing but Pebbles: but the Cause is this, there is Earth at a little Depth, and the Roots of the Corn are fix'd in it although their Stalks stand up only among the Stones. When a Soil of this Kind is perfectly manag'd, the Manure proper, and laid on in a right Manner, and at a proper Season, the Rains wash in all its Richness, and the Roots have it: in the mean Time that the Gravel which seems naked above, defends those Roots from being burnt by the Sun, and keeps a continual Moisture, in some Degree like what is seen under a Stone or Board that lies on the Ground; which feeds the Stalk and Ear every Moment.

The stony and gravelly Soils have an Advantage in this Respect, over all others; which the Farmer never fails to find, when he brings them in other Respects to a level with the others by his Dressings.

The gravelly Soils in general, produce a sweet Grass in Pasture Grounds, and when dress'd according to their several Kinds, with Mud, Dung, or Marle, they will yield it in a fair Quantity: but the Farmer is to take Notice of this, that there is no Soil for Pasturage that requires more Care than this does, otherwise, however good at Heart, it may deceive his Expectations.

For the Manure of Pasture Grounds on a gravelly Soil, there is nothing like a Mixture of mellow Dung, pure Ditch Mud that has little or no Sand in it, and the Bottoms of old Haystacks. This spread at a Season when there is a Prospect of Rains to wash it gradually in, has a prodigious Effect.

Trees succeed in this Soil rather in Proportion to what is underneath it, than to the Soil itself. The Beech often grows well in it, and the Ash. In some Places the Elm; but not universally. The Farmer may observe, however, that he need never be afraid of Trees in these light Soils hurting his Corn; for they seek their Nourishment at a greater Depth.

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## CHAP. XVII.

### *Of chalkey Soils.*

AS there are naked Sand, and naked Gravel in some Places, on the Surface of the Earth; in the same Manner there is frequently naked and almost pure Chalk: and there are Parts of ENGLAND in which the Farmers are at the Expence of cultivating it; the Rent being low. But this is not what we mean in general by a chalkey Soil. We express by that Name a Soil in which Chalk is a principal Ingredient; but where, as in the other Instances, there are other earthy Substances mix'd with it.

A chalkey Soil discovers itself to the Eye:

none more plainly: its Whiteness cannot be mistaken. There are white clayey Soils, as has been observ'd before, but they look darker for Rain; whereas the chalkey Lands appear the whiter. There is also a Greasiness in the Look of the Clays of this Colour, which distinguishes them from the others.

The chalkey Soils differ more in their several Kinds than any of the others. In those all the Difference arises from the Matter which is mix'd with the main Ingredient; but in these that principal Substance differs greatly itself in various Places. For Instance, Gravel is Gravel, and Sand is Sand, whatever is mix'd with them; nor is there much Difference between the Gravel of this Place, and the Gravel of another; but Chalk varies greatly in its Nature and Qualities. There is some as hard as a Stone, and others as soft as Marle. Yet we call all these by the same Name, Chalk.

In other Words, there is Chalk to be met with in ENGLAND, from the Hardness of a good firm Stone, such as requires a smart Blow of a Hammer to break it; down to the Softness of Marle, that may be crumbled to Pieces in ones Hands: now, as the chalkey Soils in some Places may have one of the hard or stony Chalks for their Foundation; and in others, may be compos'd principally of the soft Kind: this makes a great Difference in their Nature, and in the Management they require, independently of the several other Matters in the Mixture.

It is necessary to name these Differences in those Soils which go by the same Name, to the Farmer, and it will be necessary for him to regard them nicely; otherwise all Instruction will answer no Purpose to him. One chalkey Soil may be little improved by that Method, which in the greatest Degree enriches another; and he will learn nothing from all the Experiences of others on this Head, if he do not exactly understand on which of the Kinds of Soil compriz'd under this extensive Term, each was severally employed.

In general, according as the Chalk is harder in these Lands, the Soil is the worse: and it is better as a softer Chalk is in the Composition.

The softest Kind of Chalk, which, as I have said, may be rub'd to Pieces in one's Hands, is frequently in these Soils, mixt with a fatty and somewhat tough Substance, which converts it into a kind of marley Earth. This is really a Mixture of a greyish Clay and Chalk, and this is naturally the richest of all the chalkey Soils. It is also the easiest work'd.

A few Plowings do on this Kind of chalkey Soil; and a little Manure. They have it on the Sides of Hills in many Places in BEDFORDSHIRE, and the adjoining Counties. They dress it at a small Expence, and it produces great Crops.

When the chalkey Soil is of this soft Kind, it is to be plow'd deep, tho' not often: on the contrary, the harder chalkey Soils are to be plow'd but shallow.

It is a great Advantage of chalkey Soils, that they are the least of any over-run with Weeds, What they principally produce are Poppies, May Weed, and a few other of the slight rooted  
and



and annual Kinds. The poorest Kinds are easily got into Order; and what is spent in Manure, is in a great Measure sav'd in Labour.

In OXFORDSHIRE they are fond of throwing this Land up in Ridges; and in this they are right. The Farmer of another County laughs at them, supposing they do it for Dryness, which is not needful; but their Forefathers who invented the Practice did it for Warmth: and their Descendants who follow the same Course find the Advantages, though they don't know the Reason.

When it is of the harder Kind, they dress it with half rotten Dung; and when of the softer Sort, they lay on fine Mud, and a little well rotted mellow Dung with it. This melts into the Soil with the Rains, and gives it a surprizing Fertility.

What they call in many Counties a malmy, or maumy Soil, is one of these chalkey Lands: it is compos'd of a soft Chalk, and a white Clay together, with a little sharp Sand. This Mixture naturally makes it soft and tender: for the white Clay is not tough in the Manner of the others, as has been shewn already, and the Sand makes it more brittle. It falls to Pieces in plowing, so that it needs but little of that Exercise: and it crumbles with the least Frost.

This Soil is by Nature in the Condition that many other of the chalkey ones are brought to by Manure and Dressing: and the Farmer seeing the natural Fruitfulness of this, will know he cannot do better with many of his leaner chalkey Soils, than bring them as near as he can to the Condition of this: adding by Art what they want in Nature.

This soft chalkey Soil is to be laid in Ridges for Dryness, and for Warmth. It requires less Manure than many others. And the best is rotten Dung.

The lighter and looser a chalkey Soil is, the less plowing it requires: and if the Farmer wants to give it more than needful supposing it will still do good, he is to be informed, that he will spoil it. Too much plowing in these Soils is as mischievous as too little in the clayey. If these be broke too fine, they will not have a sufficient Body to support the Roots of the Corn, but it will fall down before the least Wind, and be destroyed.

For chalkey Soils in general no kind of Dressing is so good as that which is given by folding Sheep upon them: for this is a Manure that quickly gets into Land: and this light Soil the most readily of all receives it; and yet it has Body enough to detain, and take Advantage of all its Richness.

There is also another Advantage in this Practice, which is, that the continual treading of the Sheep press the Ground, and give it a Firmness which all these Soils want, from the Nature of their Composition.

In OXFORDSHIRE they plow in old Rags, by way of Manure, upon the poorer of their chalkey Soils, and that with great Success.

When the chalkey Soil has a Mixture of a tough Clay, as is often the Case, it becomes one of the most binding Earths the Farmer has to do with. The Manure for this Land is well

rotted Dung, with Pit Sand among it: this gives it a Shortness with the Richness, and makes it work easy, and bear well.

In HERTFORDSHIRE the Advantage of Soot is so well known as a Manure, that there are few Soils on which they do not use it. They find it a very rich Dressing for the poorest of their chalkey Soils.

They also use here the OXFORDSHIRE Manure of old Rags; but they lay them on differently. They don't plow them in as in that County; but first chop them to Pieces, and then sprinkle them on by Hand. The Rains soon rot them, and carry in their very Substance to the Soil, where it proves a rich Manure. Twenty Bushels of Soot will go as far as Five Hundred Weight of Rags; the Effect of the Soot is quicker, but that of the Rags is more lasting.

The best Crops on the chalkey Soils when well manur'd, are Wheat and Barley. In OXFORDSHIRE they make this constant Difference between the clayey and the chalkey Soil: that on the first they sow Beans after the Wheat, and on the latter, Pease; which seldom fail of yielding a great Growth.

The Farmer ought to keep a constant Regard to the Weather, when he is about to sow his chalkey Soils. It is of great Importance to him to sow in a fair and settled Season: for any Quantity of Rain falling soon after the Sowing, will bind some of these Soils so hard, that the Seed will be lost.

Oats do very well upon these Soils, but not like Wheat or Barley; and of the two last the Wheat is the most to be depended upon. The Barley that has grown upon chalkey Lands, is prefer'd by the Malster to that of any other Soil whatsoever; but this is a Crop that does not make such certain Returns, the Farmer that chuses it must stand the Hazard; for sometimes it fails strangely.

Rye also succeeds on a chalkey Soil properly dress'd: no where better.

It is not only Pease that grow so freely upon these Soils; they agree in a particular Manner with all the Pulse Kinds. Tares and Lentils will grow well upon the very poorest of these Chalks.

No Soil better nourishes the tenderer of the Grasses; Clover does not do well except upon the richer Kinds; but in general, the Saintfoin, and the other fine Grasses, succeed upon them to Admiration, because of the Lightness; particularly the Saintfoin, whose long Root pierces to a great Depth, and will therefore find Moisture and Nourishment, when all is dry and parch'd on the Surface.

Chalkey Soils are not the most favourable for large Growths of common Grass for Hay; but they furnish a sweet Kind for Pasturage; and the better Sorts of them when dress'd properly with Mud and rich Dung, will afford very fair and tall Grass. But it is a Soil naturally found in hilly Places, and that seems destin'd by Nature for the Plow; rather than for the Growth of Trees or Grass.



## C H A P. XVIII.

*Of mellow Earth.*

**W**E come in the last Place to the Consideration of that Soil which is called Mould, or mellow Earth; the Richest in its own Nature of all; and needing less Dressings than any other; yet not entirely above the Necessity.

As the Soils last treated of, the chalkey Kinds, are naturally met with on Hills; the Seat of this is in the Valleys and low Grounds; and as those seem destin'd by Nature for the Plow, these are in the same Manner for Pasture.

This is its Condition in its most pure and entire State; but there are several Kinds of this Soil, as well as of the other, altho' they have hitherto been less taken Notice of, and some of these are found on higher Situations, and admit the Plow; and yield large Crops of Corn.

What is properly called Mould, is found in its most pure State under the Turf in Fenny Countries. Here there is neither Clay, Stone, nor even Sand amongst it. In other Places it is mix'd in a greater or lesser Degree with one or other of these.

Properly speaking it is to be called Mould only, in this State, as Gravel, Chalk, Clay, and the rest are only called by those Names simply when they are pure: and as they when mixt with other Ingredients make the gravelly and other Soils nam'd from them; so when this Mould is found mix'd with Clay, Sand, or the like, it constitutes many of the ordinary Kinds of Soil. But these are not not called mouldy Soils, but mellow Earths. So Custom has establish'd.

It is only, however, when the Mould is in the greatest Quantity, that these Mixtures have the Name of mellow Earths: when the Sand is in the greatest Quantity, the Soil is called sandy; when Clay, it is called a clayey Soil. For the Mixture of Mould when small, does not give a Name to the Soils; but, as before observ'd, converts the naked Gravel, or pure Clay, or the rest into a Soil.

I have spoken all along of a pure vegetable Earth being mix'd with these several Ingredients in the Formation of Soils. This Mould which is the Foundation of the mellow Earths, is that vegetable Earth. I have said at first that it is scarce ever found entirely pure: but there are Places where it sufficiently near Purity, to give a full Knowledge of its Nature.

The Gardiners frequently desire to have the vegetable Earth pure; and on this Occasion they seek for it in old Willows, and other decay'd Trees. What they find in these Places they call Virgin Earth, and pure Earth. It comes the nearest what we mean by pure vegetable Earth: and we meet with this Mould in some of the Fenny Countries very like it in all Respects.

In LINCOLNSHIRE their fine Fen Land is of this Soil. A fine black Mould lies under the Turf in a Bed of very considerable Thickness. It is light, loose, and black, and one scarce

perceives any other Mixture in it but a little Sand, and that indeed is very little. It is spongy when wet, and when dry it easily moulders to Powder, and the small Quantity of Sand lies naked among the rest.

Some imagine Turf or Peat to be the natural Surface of all the Fen Lands, but that is owing to their Unacquaintance with the Matter. The right Turf or Peat is compos'd of decay'd Stalks of Plants, and other vegetable Substances, with a bituminous Matter that holds them together: it lies at some little Depth; and this fine black Mould in the rich fenny Lands lies over it, and immediately under the Sward.

There is no Soil in the World so fertile, or so rich, as this Kind of Fen Land, and it is owing to the Excellence and Purity of this Soil, which consists of scarce any Thing but vegetable Earth. Too much wet affects it greatly: and as it lies usually in these low Places, it is very subject to this Inconvenience; otherwise it would be preferable to all other Soils in the Eye of the Farmer.

In the fenny Countries where this Soil is frequent, they call it moory Land; and they value it very highly when it can be tolerably preserv'd from wet.

This is the pure and perfect Soil of the Fens when they are not any way spoil'd. But beside this, there is another mellow Earth in the same Situations, which they call Fen Land; this is a Name they give also in some Places to the last described; but, as they use it in some Places for the other, as distinguish'd from that by its Composition, and as it has no other Name, we must be content to call it by this to avoid Confusion.

This Fen Land is a mellow Earth compos'd of the fine black Mould just mention'd, and a tough blackish blue Clay. It is black and soft: and has at a Distance very much the Appearance of the other. This is next to the moory Land, the richest Soil that is known for Pasturage. It needs little Manure, and in most Places Nature takes Care of that Article. It generally lies in the Reach of being overflow'd by the Rivers, when swelled by Land Floods; and as this Water stands upon the Lands some time, it leaves a fine rich Mud at its going off, which serves in the Place of Manure: and is better spread and let into the Ground by the Water wherein it is brought, than it could be by all the Farmer's Toil and Ingenuity.

We read of the River Nile in *Ægypt* overflowing their low Lands, and leaving its Mud, which saves the Farmer's Labour, and occasions the great Fertility of the Soil. The same Thing in a lesser Degree happens in these Fen Countries after every Inundation.

The Fen Land when dry, is tolerably firm and hard; and it then looks of a somewhat paler Colour: when wet it is blackish, and is soft and mellow, but with some Toughness. It has also a Smell at this Time like the Mud of a Pond in Summer, when the Sun has newly dried up the Water. This Soil is more apt to be wet than the moory Land, because it has a deep Bed of Clay at the Bottom, and has too much Clay in its own Composition to part with Water suddenly.

It



It is also singular, that in the Fen Land there is no Sand. This is an Ingredient almost universal in other Soils; but in the true Fen Land, there is not a Grain of it to be found.

This Soil, though called Fen Land, because usually found in the Low Country, sometimes also is met with in the higher Pastures: but it is never so fruitful then as in the low Grounds, though it be evidently the same in its Nature and Composition.

I have particularly taken Notice of this about the Edges of the Fens, where the same Land or Soil that has run under the Turf in a low Meadow, has been continued through an adjoining Pasture which was a little rising. The Pasture in this Case never is so rich as the Meadow, and the Reason of this is certainly, because the Pasture Ground was out of the Reach of the Land Floods, which, running over the other Ground at times, left the Mud upon it to enrich its Nature.

The practical Farmer may learn by this, what he is to do with a Pasture which lies somewhat high, and has this Fen Land Soil. He is to dress it with Mud from the Bottoms of Rivers or Ponds, spreading it thin before Rain, that it may be wash'd into the Ground; it is thus Nature enriches these Lands by the Overflowings of the neighbouring Rivers, and in this Manner Art may imitate her Proceedings; which are always the best Example it can follow.

The Effect of the Mud thus wash'd into the Fen Land Soil, is to make it more and more like the Moory Soil, which is the richest of all others.

I have already mention'd in the general Account of Soils, one which in NORTHAMPTONSHIRE they call Henmould: this is common in the richest Pastures of that and the neighbouring Counties, and is little other than the moory Land taken out of its low Situation. It is blackish, light, and fine, and is compos'd of the same fine black Mould with the other, only there is more of the Sand in the Composition.

We find this Soil principally, and in its greatest Perfection, in those Pasture Grounds that lie toward the Bottoms of Hills. I say in Pasture Grounds, for the Farmers who are acquainted with its Nature, do not chuse to plow it: for, notwithstanding its Fertility, it wants a Body to support the Roots of the Corn.

In LANCASHIRE and the adjoining Counties, they have a Soil which they value exceedingly for its Fertility, and which they call the black Soil from its Colour. This is compos'd for the greatest Part, of the same fine black Mould with the moory Land, but it has a larger Proportion of Sand, and some Clay among it. To speak exactly, the black Soil of LANCASHIRE is compos'd of the Mould and Loam: according to this Composition, it differs both from the Moory Land and the Fen Land. For the first of these has some Sand in it, and no Clay; the other has a great deal of Clay and no Sand. This having both, is of a different Nature.

The black Soil in LANCASHIRE is not only very rich in Meadow and Pasture Ground, but in Corn Lands. The Clay in its Composition, is sufficient to give it a Firmness enough to support the Crop; the want of which is the Occa-

sion that the rich Henmould of the other Counties before mention'd, cannot be us'd for Corn.

In the same Part of the Kingdom they have also a rich Earth which they call the Foxglove Soil. They are not so exact in these Names as they should be; but I shall always endeavour to explain them as well as I can; my Intent in these Things being to make the Farmer of one County understand him of another.

In LANCASHIRE they in general give the Name of Foxglove Earth to a sandy Soil of a brown Colour, and tolerably rich: but in some Parts of that County, and in general throughout CHESHIRE, they call an Earth by that Name, which greatly exceeds the other in Fertility. This last Foxglove Earth is a mellow Soil compos'd of the fine Mould before nam'd, and a considerable Quantity of Loam of a redish Colour. I have observed these two distinct Soils in LANCASHIRE, the first in the low Grounds, where it makes a Soil altogether the same with the moory Land before describ'd, and the other in the Pastures on the Sides of Hills.

As I have seen these separate, and traced them to the Mixture, I have found that the fine and rich Foxglove Earth of those Counties, is compos'd of them. This is a very rich Soil for Pasture Grounds: the Grass is sweet, and in great Quantity.

I before mention'd also, an Earth which in some other Counties they call Henmould, and which is different from that which goes by the same Name among others: this is also of the Nature of the Foxglove Earth, it is a Composition of fine black Mould, a good deal of Clay, and a little Sand; or in other Words, it is compos'd of black Mould, and a clayey Loam. The whiteish Streaks they find in this on first opening it, are no other than the first Shootings of Mushrooms: what Gardiners call the Spawn of Mushrooms. The Pasture Grounds of this Soil are found to bear great Quantities of these; it is therefore no wonder this Spawn, as it is called, is found under the Surface.

This Henmould Soil will bear Corn tho' the other will not: it agrees with the Foxglove Earth in its Nature as well as Appearance: having a sufficient Quantity of Clay in the Composition to hold the Root firm.

Having thus described the several Kinds of mellow Earth in such a Manner, that they may be distinctly known from one another: it remains to give the Farmer, who shall be thus made acquainted with their Nature, the necessary Instructions in what Manner he is to employ them to Advantage.

In the first Place then, he will see by what has been said already, that as many other Soils are naturally calculated to bear Corn, these are naturally suited for Pasture.

They will all produce good Grass without any Exception: there are one or two of them that may be made to answer for Corn; but the Generality of them are not fit for that Use, nor should a Soil be forced by the Farmer.

If he happen in any Situation to have an over Proportion of plow'd Land to Pasturage in his Farm, so that he cannot raise a Supply of Dung from the Cattle of the one, for the needful



Manure for the other. In this Case it will be necessary for him to lay down some Part of his Arable to Pasture: and in the same Manner if his Pasture Land be so much, that there is more Dung produced by the Cattle than he can use on his Fields, it will be prudent in him to convert some of his Pasture to Corn Land. For it is always the Farmer's Interest, as nearly as he can, to keep up this Proportion.

Now if it happen that his Pasturage be principally upon this mellow Earth; his Business is first to examine if it be of one Kind throughout the whole Farm, or if there be a Variety.

The latter is more usually the Case: and supposing it so in the present Instance, let him chuse out the Piece that shall be plow'd according to the Account that has been given of their Natures.

The mellow Earths are all so rich, that they will supply Nourishment abundantly to a Crop of Corn; but the greater Part of them are, as has been said, so loose and crumbly, that they will not support the Crop in their Place. They will never settle enough to the Roots of the Corn to keep it steady whilst it is growing up, and when it is not firm it can never thrive.

But this is not the only Objection against converting this mellow Earth, which is the natural Soil of Pasturage, to Tillage. The finer Kinds of it are apt to be wet, they generally lie over a Bed of heavy Clay; and almost always in low Situations. The Consequence of which is, that tho' they abound with Nourishment, it is of too moist a Kind, and feeds the Leaf rather than the Grain.

I have observ'd in CHESHIRE, when some Fields of this Soil that lay at the Bottom of Hills, have been forced into Corn Lands; the Farmer has expected great Profits at first, for the Corn grows upon them prodigiously, but the Nourishment goes to the Stalk and Leaves: it is over rank in the Straw, but lean in the Ear, and to the early Promise has succeeded a late Disappointment.

Having seen thus much from Experience, I may have Leave to advise the Farmer as before, not to be too fond of converting this Soil from Pasture to Arable. But if he be under a Necessity of doing it, let him take the following Rules for his Instruction.

Let him chuse out of all the Kinds in his Ground, that which has most Clay or Loam in the Composition; for that, altho' it succeeds by so much the less in Pasture for this Addition, is the only one fit for Corn; because it is the only Kind of mellow Earth that will close enough about the Roots of the Corn to keep it upright and firm. By observing this Rule he will take the Piece that is least valuable for Pasture; and at the same Time that which is best for the Corn: thus reaping a double Advantage.

In the next Place, let him chuse such a Piece as lies somewhat rising; because the Abundance of Moisture is the Cause of that Rankness in the Stalk, which robs the Ear; and those mellow Soils that lie on the Sides of Hills, are never so damp as those at the Bottoms; the Water being continually draining off from the one, and running to the other.

This Rule will naturally fall in with the other: for the mellow Earths on rising Grounds are always more clayey or loamy than those which lie flat. This is the Consequence of the Difference of Situation, for the fine Mould is continually washing off from the one, and coming down upon the other.

When the Soils of this Kind are forced into the Service of Corn, the best Manure for them is rich Dung. It is not easy to mend the Texture of a loamy mellow Earth, and therefore all the Farmer is to aim at is, to supply the Richness of the Soil in Proportion as it is exhausted by his Crops.

In LEICESTERSHIRE where they plow some of these Lands that are a little over clayey, they dress them with Marle to good Advantage.

The same Sort of Soils I have seen in LANCASHIRE dress'd with Lime and Soap-makers Ashes; the Farmers there supposing it too cold in its Nature, and giving these Dressings to warm it: this Practice was not without Success, but the other Way with Marle upon equal Terms, I have always found had the Advantage, both in present Profit and in lasting.

In LINCOLNSHIRE they plow in Hare Skins, Rabbit Skins, and old Rags into these Soils when they dress them for Corn, as they sometimes do those that lie on the Sides of Hills.

Woollen Rags are altogether as good as Linnen on this Occasion. There is a famous Instance in NORTHAMPTONSHIRE, of a Man's dressing a Corn Land on a Soil not unlike one of these, with Taylors Shreds steep'd in Urine; the Consequence of which was such a Crop, as scarce ever had been seen.

This is a well attested Fact, all the Country talk of it; and it may serve to recommend to the prudent Farmer, a Manure which he may have at a moderate Expence from LONDON, and which is likely to answer so greatly.

Having thus far consider'd the Manures that are proper for mellow Earths, when they are used for Corn; it remains to recount those which Experience has shewn to be most useful for it in Pasture. I have already said this wants less Dressing than any other Soil whatsoever; but the best in the World may be improved by some Manures.

Before the Farmer take any other Step in this Matter, let him carefully examine the particular Kind of the Soil.

If it be a mellow Earth, with a good deal of a loamy Mixture, let him imitate, as before said, the Course of Nature in enriching it, and spread upon it at proper Times the Mud from Ditches and Rivers.

If the Soil be a mellow Earth, with an over Proportion of Clay, such as the Fen Land is, where there is no Sand in the Composition, it is to be dress'd with rotten Dung, mix'd with the Cleanings of the Highways, which are of a sharp sandy Nature, and will by Degrees get in and break the too great Firmness of the Clay, reducing it to a Kind of Loam.

These Soils may also be improv'd according to their Composition and Situation by Dressings, consisting of Earths or Soils of other Kinds. Thus the moory Land of LINCOLNSHIRE might be



be converted as it were, into the black Soil of LANCASHIRE, by dressing it with a brittle Loam, as that would mix both Sand and Clay in the Composition; and thus it would be made fitter for the Plow, if it be needful to put it to that Use.

In the same Manner the Henmould of NORTHAMPTONSHIRE, and other Counties, might be made more fit to receive and sustain Crops of Corn, by dressing it with a clayey Loam, which would break in upon it by Degrees, and when well mix'd with the Plow, would give it that Firmness it wants.

This is considering Manures in a Light in which they are not sufficiently regarded by the Generality of Farmers. The common Way of dressing with Dung, and the like, is enriching, but this is making a Soil.

The richest of these Soils for Pasture, that is, the moory Land, is liable to great Damage by wet. The Remedy for this is burning the Land: this is practised to great Advantage in all the Fen Countries; and it may be introduced elsewhere to the Farmer's great Profit.

The moory Soil, as it most wants this Method of Improvement, so it succeeds with it the most readily of all; burning more freely than any other Land: the Herbage on its Surface kindling easily, and burning well.

The Method practised in LINCOLNSHIRE, where they understand this Practice best, is this, they plow up the Sod as shallow as they can, and pile it up in little Heaps, laying some Pieces of Furze Bushes, or some Pieces of Peat Earth here and there among it, to make it burn well. When this is done, they spread the Ashes which greatly enrich the Land: so that it becomes not only drier, but in all Respects better than before.

The Trials that have been made of reducing this Pasture Soil to Arable, have seldom succeeded: after a little Time the Farmers have been glad to lay it down to great Sward again.

If at any Time the Farmer who should try the Experiment, should be brought to the same Necessity, as is not unlikely, I shall give him the Advice that the last Crop he sows upon it be Wheat. Because in that Case the Ground will gather Grass before the Wheat is cut: and the Stubble is of use in manuring the Ground.

But tho' these mellow Earths in general do not succeed so well with Corn, there are other Crops for which they are plow'd to great Profit.

Coleseed will thrive exceedingly upon the mellowest of them all. They frequently plow up the moory Land, which is all black Earth, without almost any other Ingredient for this Purpose, and it yields vast Crops.

The principal Manure they use for the Lands on which they raise this Crop, is the burning of

the Sods before mention'd; and they find that Coleseed always thrives vastly better on a fresh Land than any other: but it will succeed very well on the same Land again; burning the Stubble.

This is the only Use the Stubble of the Coleseed Plant is fit for, they never plow it in, for it is so hard and sticky, it will not soon rot.

Oats, next to Coleseed, thrive best on the richer Kinds of these mellow Earths. As the Coleseed does best on fresh Land, the Farmers in LINCOLNSHIRE, when they have had one Crop of Coleseed, generally sow Oats the two or three following Years, which answer very well with a little Manure. They sometimes sow Wheat or Barley after the Coleseed, but it is not so sure of Success. In a dry Year it is often render'd of no Value, by tumbling down from the loose Nature of the Soil not holding the Roots; and in a wet Year, the Ground becomes so damp, that the Growth is rank in the Stalk, as mention'd before, but thin and poor in the Ear.

After three Years Oats, upon a Year of Coleseed, the Custom is to lay it down for Grass. For this Purpose they sow Ray Grass with the last Oats; and when it has been kept thus six Years, they plow it up slightly, and burn the Sod, after which they sow it with Coleseed again.

The mellow Earths of the finer Kinds, are not very favourable to the Growth of Trees. One Reason of this is, that they want Firmness to hold the Roots, for there is Abundance of Nourishment; another is the great Moisture.

In the purest Kinds, such as the moory Land, we see scarce any other Tree except the Willow. This is the Fen Tree, and often in the Compass of a great many Miles, no other shall be seen.

As the mellow Earths partake more and more of the Nature of the other Soils, they more resemble them in their Trees. Thus when this Land gets a small Proportion of Loam, the white Poplar grows freely upon it: and the Foxglove Earth of CHESHIRE, and some of the mellow Earths of NORTHAMPTONSHIRE, bear the common Kinds of Trees in sufficient Perfection.

In general, Trees grow quickest in a rich, but they are firmest in a strong Soil. The Oak grows tediously in the clayey Grounds of NORTHAMPTONSHIRE, but its Wood is found in Proportion.

This is not an Observation in favour of these mellow Soils for Trees: but 'tis proper, since the Truth confirms it, to lay it down as a Caution to the practical Farmer, that he make no Attempts of that Kind. Every Soil has its natural Produce: and so far as Convenience will allow, that should be followed; for whatsoever is the Growth to which a Soil is fitted by Nature; the same is that with which it will best succeed under the Improvements of Art.





## Appendix to the FIRST BOOK.

*Of the Uses of Clay, Loam, Sand, and other Substances found on or in the Earth, in the various Arts; and their Value to the Owner.*

### The INTRODUCTION.

*Of the Design and Bounds of this Appendix.*

HAVING consider'd the several Kinds of Clay, Sand, and the like, as they enter into the Composition of the different Soils; it remains that we enquire into their Nature and Uses in their pure and unmix'd State.

They not unfrequently lie on the Surface of the Earth, or make its uppermost Covering in their entire State. It has been observ'd already, that in this Case they are not properly call'd Soils, though they take the Place of a Soil; and that they are frequently, in this Condition, not worth the Expence and Labour of Dressing.

Although they do not come under the Farmer's Consideration in this State as Soils; yet making a part of his Land, it is needful he should understand their Value, and how to make the most of them.

This Examination did not come under the Heads of the preceeding Book; the Subject of which was the understanding of Soils, and their Improvement for different Growths: to avoid Confusion, it is therefore treated of in this Appendix by itself.

To enquire into the whole Compass of the Uses to be made of Things found under the Surface of the Earth, would be a Subject too wide; and foreign to the Purpose of this Work: but so much of this Enquiry as may concern the Farmer or the Country Gentleman, shall be insert'd. The Design of our Undertaking is to inform the Possessor or Cultivator of Land, whether Owner or Tenant, of all it can be useful to him to know respecting it. The Plan of the Work engages to enquire into these occasional Uses of Clay, and the other Substances; and it would be leaving the Possessor of Lands in the dark, as to some Uses he might make of them, should any Thing of this Kind be omitted.

The Intent of this Work is to be as largely and as generally useful as possible.

### CHAP. I.

*Of the Uses of Clay.*

THE Farmer who finds Clay naked on the Surface of some Part of his Land, needs not despair of Advantage. Though it may not be worth the Charge of Culture, it may answer other Purposes: and that he may know what to expect from each Kind they shall severally be recounted.

The first Thing to be done is, to enquire of what Kind the Clay is, and of what Nature. Here following the Division before establish'd of the four Kinds of Clay according to their Colours; the two first, that is, the red and yellow, are the most frequently found at or near the Surface: the black and the white Clay in most Places lie under the Soil, or at greater Depths.

When these are altogether pure at the Surface, he may begin with them there, but when they have some Mixture there, as where there is what may be called a very poor red clayey Soil, the red Clay will probably be found quite pure and entire at a little Depth, and that often in so thick a Bed, that the opening a small Pit for it, brings great Profit with very little Expence of Labour.

The red Clay is the most valuable, as it answers not only the best Purposes, but the greatest Number of them. It is not of a perfect red Colour, as the Name usually given it seems to express; but brown with a Tinge or Cast of redish. It has the Name of red by way of Distinction from the yellow.

Nothing is equal to pure red Clay for securing the Bottoms of Ponds for holding Water. When the Nature of the Earth is so loose that they drain dry, whether the Soil be gravelly, sandy, or whatever, if the Bottom be lin'd with red Clay well rammed, the Pond will hold Water for many Ages, as if it was dug in a Bed of Clay. In some Places they improve upon this. They first ram down a lining of red Clay, and upon that lay a good pitching of Stones; this makes a Bottom as firm, as secure, and as durable as Lead.

The



The red Clay exceeds all others for the Brewery. 'Tis beat and temper'd to a due Consistence for covering Bung-holes of Barrels. If the Farmer at any Time finds it apt to crack, the Remedy is to beat it up afresh with strong Brine instead of common Water: this keeps it firm and entire.

In the Grafting of Trees they prefer the red Clay to any other, but they beat it up with Horse Dung, this prevents it from cracking as it dries: with Hay chopt small, it makes a Covering for Sheds and Cottages, instead of Walls. This answers the same Purpose with Dung in the other Instance; and might in others.

When calcin'd, it makes an excellent Manure. This Management reduces it to a Powder like Ashes. This is to be sprinkled by hand over the Ground, and is excellent either for Pasture or Corn Lands: it gives Strength and Heart to other Soils. This is a new Practice, and is one of the great Improvements of the modern Husbandry.

These are the principal Uses of the red Clay, and from this it is very plain, that a Pit of it open'd in a convenient Place, may be of vast Use to the Proprietor himself, and may afford considerable Profit by the Sale.

The yellow Clay is nearest to the red in its Nature and Qualities, and is used in general for the same Purposes. It is often found as perfectly pure as the red, and is then as smooth and fine, but it wants something of that found Firmness there is in the red Kind. Where the red is to be had, this is to be rejected as inferior, but generally those Counties which produce the red in Abundance, have little of this; and on the other Hand, those where this yellow Clay is common, have not a great deal of the red.

Nature seems in these Counties to have given the yellow Clay to make Amends for the Want of the red; and it is to be used in its Place, but there must be more Care in the managing it. Although it seems to temper with less beating, yet in order to bring it to a good lasting Consistence, it requires more than that; and when all is done, it is more liable to crack as it dries, and to waste upon the Surface by continual wet: for it soon grows soft and pappy where wet always lies upon it, though this be only to a little Depth. The other therefore, where the Farmer has his Choice, is to be prefer'd for all Purposes.

There are many Things in which the red and yellow Clay agree, as they are nearly of the same Nature. Either of them will serve for Bricks: the red in particular makes an excellent Kind, of no very bright Colour, but of great Strength. They are not us'd much, however, for these Purposes: the Brick Makers do not chuse to make pure Clay; it takes a great deal more Labour and Time to temper it for the Mould; and when it is done shrinks in the drying. The Bricks made of it are strong, but dear.

They prefer for their Uses some of the Loams to be described in the next Chapter, because they cut and temper easier. Where these are not to be had, they will use Clay, but then they mix it with Ashes, and the Dirt out of Streets

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to give it a due Shortness, and make it work easily.

When the Loams which they properly call Brick Earth, are not sandy enough, they mix Ashes or other dry Stuff with them in the same Manner.

Both the red and yellow Clay are used also in the Potteries of several of our Manufactures, but seldom alone. The yellow is one of the Ingredients of the common STAFFORDSHIRE Ware; and the red is mix'd into the Compositions for their better Work. The yellow is also a common Ingredient in making of Garden Pots for it burns to a redish Colour.

The best natural Clay I ever saw for Bricks is in OXFORDSHIRE, where in several Places I have seen a mix'd Kind, partly yellow, partly blueish, of a tender Nature, and with some Sand among it; this works easily, and makes exceeding good Brick.

If the Farmer find an Earth of this Kind, provided it be in the Way of good Carriage, it is a Treasure; no-body will take the tough Clays for Bricks, if they can get these which are tenderer: if they are absolutely brittle it will not do, but the middle Consistence is what gives them their Value.

It is very common that where the Clay near the Surface, is of a tender and brittle Kind, there is a Bed of a firmer and tougher Sort underneath. It often happens that these two being mix'd together, make an Earth of a due Consistence. For these Reasons he who has a mind to make Bricks upon his own Ground, needs not be disheartened whatever be the first Appearance of the Clay, for where there is almost any Sort it may be done. The very foul and brittle Kinds are the only ones that can't be us'd for this Purpose: otherwise they may be either wrought alone, or mended with Dirt or Ashes, or one Kind will mend another.

I have observ'd in some Places, a yellow Clay with a small Admixture of Sand in it, this is so little that it does not deserve to give it the Name of a Loam. This is an excellent Earth in Pottery. It often lies in STAFFORDSHIRE near the Surface, sometimes on the Surface of the Ground, and they make Mugs, Dishes, and a very good Kind of Earthen Ware of it alone. It is so firm that it works well, and another good Quality is, it takes the glazing excellently.

The red Clay being firmer than this yellow Kind, one would suppose it would make a stronger Ware: but I have observ'd the contrary, where they work the best of the red Clay singly into any of the tolerably fine Ware, it does not take the Glazing well, and it is very brittle.

The very toughest and finest of all the STAFFORDSHIRE Earths, of which they make such Advantage in their Potteries, belongs in some Degree to the yellow Clay Kind. It is a pure, tough, and firm Clay, but is not uniform in Colour, being mixed and streaked with white. This they call Bottle Clay in that County, and value it more than any other for the Body of their Ware.

Thus much I have thought needful to observe in respect to the two first Kind of Clays, that



the Person in whose Hands they may chance to lie, may understand their Nature and Uses, and consequently their Value. That he may not overlook through Ignorance, such as are worth his Consideration, nor be inveigled by scheming Persons, to undertake Works for which they are not fit.

As to Bricks wherever there is a tolerably good Clay, they may be made one Way or another, as describ'd already : as to the Potteries, there is more in the Mixture of different Kinds of Clay, than in using any singly. But it is certain that the fine STAFFORDSHIRE Bottle Clay, which is the Ground Work of their Pottery, is to be found in other Places ; for I have met with it in WORCESTERSHIRE, LEICESTERSHIRE, and HAMPSHIRE.

Under the Head of BLACK CLAYS, we usually comprehend all that are of a dark Colour, the blueish and dingy, as well as the entire black, which is less common.

The blueish black Clay, which is the most common Kind, usually lies at some Depth ; but it generally makes Amends for the Trouble of getting at it by the Thickness of the Bed. It is a pure, hard, and tough Clay : its general Use is for making of Tiles for Houses, and it has thence got the Name of Tile Clay.

There is at least as much Toughness in this as in the red Clay of the firmest Kind, but they are contented to work it without Ashes or Dirt, because they are paid a better Price for the Tiles, and because they require to be stronger, and of sounder Materials, as they are more exposed to Weather, with a thinner Substance.

There is also another Reason why they work this tough Clay entire, and without Adulteration for Tiles. They must be made of an Earth that will bear bending, for the Ridge and Gutter Tiles require this in a great Degree, and no Earth will bear this that has any great Mixture of Sand or Dirt : they therefore are honest thro' Necessity in this Case, and use the Clay pure.

The red and the yellow Clays often rise to the Surface in such a Degree of Foulness, that it is possible either to cut them as Clay, or to cultivate them as Soil at the Owner's Choice ; but it is not so with the black. Where that is so mix'd that it can be cultivated, it is never worth taking up as Clay ; and where it is so pure that it may be us'd as Clay in Manufactures, it is very rarely worth the Expence and Pains of Cultivation.

Beside Tile-making which is the general Use of this Kind, they in many Places work it into a Sort of Pottery ; when us'd alone it makes but an indifferent Ware ; but being mix'd with other less compact Kinds, it gives a great deal of Strength and Firmness.

In NORTHAMPTONSHIRE they have a Clay that is quite black, and the Use they make of it will seem at first Sight extraordinary, they make Tobacco Pipes with it : but it burns to a perfect Whiteness.

This Clay is dug near the Town of NORTHAMPTON, and was one of the first used to this Purpose in ENGLAND. It is a fine, smooth, soft Clay, of a deep black, free from any Admixture of Sand. It is very heavy, and is naturally so

hard, that they are oblig'd to soften it with Water to get it out of the Pit.

This is so valuable a Clay, that it is well worth the Owner's while to regard it very carefully if his Land promise to contain it. Sometimes it lies near the Surface, rarely at any great Depth ; and it is usually in vast Cakes or Benches, and not in a continued Bed.

It is not confin'd to the Place I have named for Use, nor to the single Article of making Tobacco Pipes. 'Tis carried by Land from NORTHAMPTON into all the neighbouring Counties ; and is one of the principal Ingredients in the NOTTINGHAMSHIRE Potteries.

Next to this is to be named a deep gray Clay, that in the same Manner burns white, and is used also for Tobacco Pipes. It usually lies near the other ; and scarce differs at all from it except in the Colour.

There is a black Clay found in many Parts of ENGLAND, which is as fine and as tough as the former of these, and would answer the same Purpose of Pipe-making, but it burns red. This makes an excellent Kind of red Pottery, and is used in many Parts of ENGLAND. The Farmer will not be able easily to know one of these Kinds of black Clay from the other by the Eye ; but if his Land affords a black Earth of such a Kind, he needs only put a Piece of it into the Fire : if it burn white it is the Pipe Clay ; if red, the Potters Kind, but either is very valuable.

As I include the blue among the List of black Clays, I must here name another very valuable Kind ; it is of a dusky Lead Colour, and is one of the better Sorts of the STAFFORDSHIRE Earths. They there call it by an odd Name, white Clay ; but this is because it makes what they call a white Ware. This is not absolutely white neither, but of a pale yellow ; however, it is the lightest colour'd of any they make, so they give it this Name.

The Owner of a Piece of Land where this Clay is found, possesses also a Thing of Value. He will in a great Measure judge of it by its Colour, which is particular, but if it become of a pale yellow when put into the Fire, he is sure to be right. If there be a Pottery within any tolerable Distance it will sell well.

In the last Place is to be nam'd a medicinal Earth of this Kind ; it is a black Clay of a fine Texture, which burns to a pale grey, and is good against Purgings, having the same Virtues with the Lemnian Earth and Bole Armenick.

The WHITE CLAYS are of as great Use and Value as any of the former. But they differ more in their Nature than any of the others : some of them being as tough as the pure black Clays, and tenderer than any of the other colour'd ones whatsoever.

I have mention'd just now a black Clay that is us'd in NORTHAMPTONSHIRE for making of Tobacco Pipes ; but the Clay that is commonly us'd for that Purpose is white. All that is sold under the Name of Tobacco Pipe Clay in LONDON is white ; and the fine Pipe Clays of POOL in DORSETSHIRE, and of the Isle of WIGHT, which are the two most famous kinds in the World, are also white.

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The Pipe Clay of the Isle of WIGHT is of a beautiful clean white, and as tender almost as Marle: that of POOL is of a less pure white, and of a tougher Consistence. Neither of these do so well as a Mixture of both, which is the common Way of using them. The People who sell the Clay to the Pipe-Makers, temper one with the other till they bring the Mixture to a due Consistence.

The black Tobacco-pipe Clay of NORTHAMPTON is carry'd as far as OXFORD, among other Places, and there it is used for Pipe-making, mix'd with a white Clay that is dug on SHOTOVER HILLS; which last is a tolerable fine Clay, but has not the Consistence of the NORTHAMPTON Kind.

The Reason why I have been thus particular is, that the Person who finds a Clay upon his Land, which has any Appearance of answering the Purpose of Pipe-making, may not be dishearten'd, if upon getting a Tryal made the Workmen shou'd tell him it is too brittle or too tough; or shou'd find any other Fault with it as to the Consistence.

Pipe Clay is a Thing of Value, wherever it is found, for it is one of those Earths that sell at such a Price they will pay Carriage: and the Owners may see by this, that if be of the genuine Pipe Clay Kind, it is worth Money, for mixing with others that may be faulty in the opposite Extream, even tho' it cannot be used in the Manufacture alone. He will be able to guess, whether it be of the Pipe Kind by this, that it is not so heavy and tough as the other whitish Clays, and is of a cleaner Colour.

There is another Kind of white Clay, which it is worth while to seek after, if there be any Probability of its being found in the Land; this is what the STAFFORDSHIRE People call HARD-FIRE CLAY: it is of a dull white colour mix'd with a great deal of yellow.

This does not greatly differ from their Bottle Clay, which is yellow streak'd with white. The principal Difference is, that in that Kind the yellow Part is greatest in the Mixture, and in this the white.

This is of great Use in their Potteries, being one of their best Earths.

I observ'd it is worth while to seek after these Clays, if there be any Probability of finding them on the Land: for very often they may be discover'd, altho' they do not rise to the Surface: if the Plow cutting deeper than ordinary at any time turn up a Piece of Earth of any of these Colours, tho' it be foul and sandy, 'tis worth while to open a little Pit in some Corner of the Field, and examine how it is deeper. Very often the best Beds of these valuable Earths are foul at the upper Part from the Soil that lies over them; though they are found altogether pure at a greater depth.

The same Sort of white Clay that is used by the Pipe Makers, is also used in some Quantity by the Sugar Bakers, in the refining of their Sugars. They temper it to a just Degree, and lay it on the Top of the Sugar Pot, from whence the Water soaking gradually through the Sugar, carries off all Foulness with it. A very fine Kind of Bricks may be made of the

tough white Clay, but few will be at the Expence.

Indeed he who finds a Clay of a good Kind upon his Lands, misses a Treasure if he neglects to dig it. He cannot expect to know at once, all the Uses that can be made of it: Prudence should direct him to offer it to the Manufacturers of the several Kinds, that if it do not suit one he may have his Chance with another. And when he finds any one ready to bargain, let him take Care how he parts with his Property in the Grounds.

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## CH A P. II.

### *Of the Uses of Loam.*

I Have mention'd among the several Uses of the Clays, that of making Bricks, of which there is so vast and so continual a Consumption: but the Earth of which they are principally made is Loam.

The tough Clays are to be work'd up with Sand, Dirt, or Ashes, to fit them for Brick-making; and the Loams are Earths thus ready prepared to their Hands, so that all that previous Expence is spared. Loam is a Composition of Clay and Sand made by Nature, and this answers to the artificial Mixtures of Clay, and the before named Ingredients.

In some Places the Loam is so favourably mix'd by Nature, that it requires only to be beat together, and work'd into Bricks: and it is a farther Advantage that this Earth usually lies near the Surface.

It is not strange this is prefer'd to the several tough Clays which are dug at greater Depths, so that the first Charge is more; and which are after this to lie expos'd to the Air several Months, and then to be made up with other Mixtures.

Where there is fine Clay there seldom are any Beds of Sands near; on the contrary, where there is Loam, there is commonly loose Sand not far off. This is another Advantage, because Sand is very necessary in Brick-making.

As Bricks are intended for different Uses, and to be sold at various Prices, they are made from different Materials, or at least different Mixtures: the hardest Kinds are made almost of pure Clay, the softest and worst are made of the basest Mixtures, as Loam and Street Dirt: some are so bad, that they will hardly hold together.

What they call Clinkers, and use for the Flooring of Ovens, and other such Work, are made of a tough whitish Clay without any Mixture.

The fine pale yellow Bricks we see in some well built Houses, are made of the same Sort of yellowish white Clay, with a little Mixture of Sand; and these have four Times the Labour of the ordinary Bricks bestow'd on the tempering them. They seldom are perfectly good unless a very large Price is paid.

The fine bright red Brick which is used as an Ornament about Doors and Windows in many Places, is made of a pure and unmixed Loam, which contains a large Proportion of Sand,



Sand, and that very hard and sharp, to a small Quantity of Clay.

The Manufacture of the common coarse and cheap Bricks I have shewn already.

Tho' Clay alone will therefore make good Bricks, yet as many of the very finest, and almost all the ordinary Kinds are made of Loam, this was the proper Head under which to consider them.

A brownish Loam is most commonly used for Brick-making; and when a loamy Soil of this Complexion is too poor for Cultivation, it seldom fails to offer the Owner this Use. But as it is a very common Earth, the Question will be, Whether the Situation is likely to occasion a Demand for them: for neither the Earth, nor the Bricks, will pay any long Carriage.

A yellowish Loam is after this, the most frequent Kind used in Brick-making; and sometimes it affords a Brick that is of value enough to merit Consideration. The Owner of Land where such a Loam turns up, will do well to try it in the Fire. A small Piece of it will make the Experiment, and if it burn quickly to a high red, it will be worth his more strict Trial, as it may afford the fine red Brick, which is always best when made of this Loam pure, tho' some use Mixtures.

A blue and yellow brittle Clay is common in many Parts of ENGLAND, with a slight Admixture of Sand in it. This they make into Bricks in OXFORDSHIRE, LEICESTERSHIRE, and many other Places, and they are much better than the common Rate of Bricks in LONDON.

In WILTSHIRE they use a yellow clayey Marle for Brick-making, and it answers tolerably well. It is tender and works easily. The Bricks are about as good as the midling Sort in LONDON; and they are better made, for there is no Place where Work is done in so slovenly a Manner.

I have seen also a brownish marly Clay us'd in other Counties to the same Purpose, and with about equal Success. These Earths work well, but the Marle is no good Ingredient, and makes the Bricks brittle.

About NEWCASTLE in STAFFORDSHIRE, they make Bricks of a brown Loam, which burns blue. These have an odd Appearance, for blue Bricks are uncommon, but they are strong. The ROMANS seem to have prefer'd this Earth to many others, using it for their Urns; many of those found in KENT, and other Places, being of this blue Colour.

I infer from this, that probably the Earth of which they are made, is found in the same Places. This is worth some regard as it is of no inferior Kind for Brick-making.

Though the making of Bricks be one of the principal Uses of Loam, and is far from being the only one. Loams of many Kinds, when they are of a due Toughness, which is owing to their having a large Proportion of Clay, are used in the Potteries of different Counties; and in other Places where they are not of a Firmness to enter into the Composition of the Body of the Ware, they are used in the Painting of the Outfides of the several Kinds.

In STAFFORDSHIRE, where they are particularly curious in enquiring into the Nature of

their Earths, they distinguish those they use in the Pottery into two Kinds, the first they call throwing Clays, the other Slips.

The throwing Clays are such as are tough, and will work upon the Wheel; these are all Clays, and they make the Body of their Work. The Slips are such Earths as are brittle, and these they use in Painting and Colouring the others. These are principally Loams, but they prepare them for Use by first mixing them up in Water, and letting all the Sand subside, so that they take only the pure Clay that was in the Composition.

There is a grey Earth with Lumps of yellow among it, frequent in that County; the which I have seen also in LEICESTERSHIRE, WARWICKSHIRE, and elsewhere; this is a dirty Loam. They prepare it as before observ'd; and when the pure Clay is mix'd up with Water to the Thickness of a Syrup, it gives the deep yellow to all their Ware.

They use a bluish Loam, which has so little Sand, that it might be call'd Clay, for a paler yellow, having prepar'd it in the same Manner.

And, finally, they use a great deal of a dusky reddish Loam, which when treated in the same Manner gives the black Colour.

The last of these Earths is common in half the Counties in ENGLAND; the blue is less frequent, but I have seen it in WORCESTERSHIRE and elsewhere. All these Loams may have their Value if a Pottery shou'd be near, and they should be wanted upon the Spot, otherwise they do not demand much Notice.

But there is yet a Loam to be spoken of, which whenever it shall be found will be an Estate to the Owner, and also a Benefit to this Country. This valuable Kind is what they dig at present only at the Village of HEDGERLY in BUCKINGHAMSHIRE upon the Edge of BERKSHIRE. They call it there Fire Earth, and the Bricks they make of it Fire Bricks; this Name is given them from their great Strength in bearing the Fire: in LONDON the Earth is known by the Name of WINDSOR Loam, and sells at so large a Price as Ten Pence or a Shilling a Bushel.

They call it WINDSOR Loam, because it comes from WINDSOR to LONDON, HEDGERLY being only a few Miles from WINDSOR.

This valuable Earth is a true Loam, and one of the hardest in the World; it is of a brownish yellow Colour, very coarse to the Touch and brittle: being put into the Fire it becomes of a fine strong red.

These are the Marks by which it is to be known, and it cannot be too diligently searched for, the Vein of it at HEDGERLY being in Danger to be worked out, from the great and long Consumption. The Person who works it at present having dug for it all the Ground he had, took another Acre for the same Use some time since at a great Price, but on digging he has found the Bed of it does not continue.

The Use of this Earth is to face the Ovens at Glass-houses, and for all other Service where there is a great Violence of Fire. The Chemists, Refiners, and others use it also to cover their Glasses, and other such Work. And the Bricks made



made of it are the only ones to build the Ovens and Furnaces themselves, nothing standing the Fire comparably to it. This Earth whether in Bricks, or in the Coatings before nam'd, will presently turn to a fine red Colour, and then will stand many Years unalter'd, where a Piece of common Loam would be run into Glafs in a Minute.

Yellow Loams are very common: and it is highly probable, not to say certain, that this particular and valuable Kind is produced in other Parts of the Kingdom, beside just the Spot which now supplies not only all this Kingdom, but several others, for a great deal of it is exported, for the Purposes of Glafs-makers, Melters of Metals, and the like.

Every harsh yellow Loam may be try'd for this Use, comparing it first with the HEDGERLY Kind, and then making it into Bricks: for the Bricks made of the right Fire Earth, when properly burnt, are as red as those soft ornamental ones already mentioned.

Not only a Bed of this Earth may be somewhere discovered to the great Profit of the Owner; but by frequent Trials perhaps a Loam may be made artificially, which will answer the same Purposes. The only Ingredients Nature has us'd in this are a very sharp, hard, and large Sand, of a pale brownish yellow Colour, and a yellow tough Clay. Now if such a Sand should be found in one Part of the Kingdom, and a Clay of exactly the same Kind in another ever so distant, they might, on being mixed in a proper Proportion, make exactly the same Loam that is dug in this particular Place. If the proper Kinds of Sand and Clay shall be once found, the Proportions will easily be discovered by making a due Number of Tryals.

Thus not only the Loam of HEDGERLY is to be sought for in its own Nature in other Places, but Sand Pits and Clay Pits are to be searched on this Occasion with a reasonable Hope. If the Sand be found in one Place, the Clay may be found upon another on the same Estate, or in the Neighbourhood.

What makes me the more strenuously recommend this double Search is, that in the Piece of Ground newly taken by the Man of HEDGERLY, into which the Bed of Loam does not run as he expected, there is found a Bed of yellow Clay, and another of a pale colour'd harsh Sand, which are evidently the Things of which the Loam is compos'd in the other Pit. And a Gentleman of LONDON, very curious in these Things, assur'd me, that by mixing these together, he had made a Loam altogether like the other, and of equal Use for the same Purposes.

The Sand is also in some Places found loose in the right old Loam Pit; and there are Parts of the Vein which have a great deal of Clay, and Parts which have very little, being almost entire Sand, and scarce capable of holding together. The Workmen work all these together, and perhaps sometimes mix some of the Sand with them; beating up all together to a due Form, which they from long Experience know by the Eye.

All this leads me to believe the Mixture  
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may be entirely made by Art, and he will be happy who finds the Method.

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### C H A P. III.

#### *Of the Uses of Sand.*

CLAY is the Earth which is employ'd to the most Purposes beside those of Husbandry; and the next in Use to it is Loam: That has not nearly so many as Clay; and the other Kinds to be treated of, have much fewer than either. In the succeeding Chapters I shall consider Sand and Gravel. These are somewhat of kin to one another in their Nature, Sand being little other than a smaller Gravel; and Gravel little other than a larger Sand; and some of their occasional Uses are the same.

Where either bare Sand or bare Gravel are at the Surface taking the Place of Soil, they are not worth Culture: the Owner is therefore to enquire what Use he can make of them. And this will be greater or less according to the Situation of the Place where they lie, more than to any thing of Variation in their Kinds.

Sand is us'd as a Manure to Clay Grounds in some Places, and that with good Success; and, as has been shewn: this is a Practice founded on Reason.

The various Kinds of it also are us'd to many other lesser Purposes, for which they are severally suited by their Fineness, Coarseness, and other Accidents.

In BUCKINGHAMSHIRE the fine white Writing Sand, which is elsewhere sold at a considerable Price, is so common, that they strewn Rooms with it, as in other Places they do with the ordinary yellow Sand.

In many Parts of MIDDLESEX, there is a small deep yellow Kind, which feels like fine Powder to the Touch, having scarce any Sharpness. They make no Profit of it there: but the same Kind of Sand is sold at a great Price at BILSTON in STAFFORDSHIRE, where there are some Pits of it; for the Use of People who cast Metals.

Pure white Sand is us'd in making the finest Glafs. It in this Case perfectly well answers the Purpose of Crystal; being better than Flints. For indeed white Sand is no other than small Pieces of Crystal, just render'd cloudy by a white Earth; as the other Kinds are colour'd, and more debas'd in their Nature by yellow or redish Earths.

Clean Sand, and of various Degrees of Fineness, is also used by Glafs Grinders: and the finer Sorts by Plumbers for making the Bed on which they cast their Sheet Lead.

In STAFFORDSHIRE also they sift a Kind of yellow Sand, first from the Dust and small Pieces in a fine Sieve, and afterwards from the Stones, or small Pebbles that are among it in a larger; and having thus brought it all to an even Size, they spread it upon Boards, and whet their Seythes on it: from this it has the Name of Seythe Sand, by which it is known throughout that County.

It is usual to distinguish Sand into three Kinds; Pit Sand, River Sand, and Sea Sand.

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The Pit Sand and River Sand have no other Difference but this, that the River Sand is well wash'd, and the Pit Sand has often a great deal of Dirt among it. There are as many Kinds of one as of the other, and of as many Colours; but this is all the Difference, for the River Sands are wash'd out of the Banks by the Water.

Sea Sand is often in its Original of the same Kind with that of Rivers, but it usually has some Fragments of Sea Shells mixed with it; the Waves washing them to Pieces on the Shore. In some Places what they call Sea Sand is made up almost entirely of these. This is used as a Manure to Land in some Counties, and gives it a great Richness and lasting Fertility.

The common Sand when us'd as a Manure, can answer no other Purpose but solely that of breaking the Clay: but this which is of an Animal Nature, operates as all the other Animal Substances; and by its Saltiness.

#### C H A P. IV.

##### *Of the Uses of Gravel.*

THE Uses of Gravel for Walks are sufficiently known; but the several Kinds of it differ exceedingly in their Value. This is not owing to any Thing in the Body of the Gravel itself, but to such Mixtures as Nature chances to have thrown among it in the Beds.

All Gravel is made up of small Pebbles and Flints, but in some there are fewer of the Flints than in others, and in some Beds of Gravel there are almost none; and so of the other Mixtures.

Some Pits afford a Gravel made up only of roundish Pebbles of a bluish red Colour. These look as if they had been wash'd, having no other Matter of whatsoever Kind among them.

A Pit of this is hardly worth opening, for it is a Kind of Gravel that from its own Nature can never bind; nor is it possible to add any Thing, except in a vast Quantity indeed, that will make it. A Walk laid with this seems compos'd of loose Stones, and always continues uneven, and troublesome to walk upon; neither is the Colour agreeable.

In other Pits we find Gravel that has a great many Flints, and a great deal of Sand among it; and in this the very Pebbles are usually of a paler Colour. This does a great deal better for all Purposes of laying Walks, because the Flints and Pebbles not being all round come closer together, and the Sand fills up in some Degree the Crevices between them.

These Gravels, however, bind but moderately; and often the Sand will be wash'd away by hard Rains, and leave Spaces empty between the Stones.

The best Kind of Gravel of all, is that which is compos'd of somewhat irregular Pebbles, with a great many Flints, and with a good deal of a marley Loam among it. This is the fine Gravel of our Kingdom; the Loam is yellow, and gives that Colour to the whole. It also makes it bind tight and firm, for it fills up all the Spaces between the Stones, and the Clay

that is in its Composition keeps them all firm, and prevents the Sand from rising in dry Seasons.

These several Kinds of Gravel may be screen'd to what Degree of Fineness the Purpose requires: and the Owner who sees to what the Excellency of the best Kinds is owing, may here as well as in other Cases, imitate Nature, and improve the others.

I would not have him undertake so bad a Task as to make a good Gravel out of the round clean Kind first named, by adding any Thing to it: but if his Land afford in any Part a Gravel that is pretty good; and there be a Demand for it, he may add Cent per Cent to its Value by a little Trouble.

If it be too apt to throw up the Sand in Dust in dry Weather, let him order some tough Clay first temper'd soft with Sand, and Water, to be thrown and stir'd well in amongst it: or if he have some that wants only a little more Loam, let him add it freely, this will give what they want, and convert ordinary into excellent Gravels.

Among the Gravel there are in most Places dug up a Sort of large smooth Stones of the Bigness of a Man's double-fist, or near: these are no other than the same Pebbles that are in the Gravel only larger in Size, and they are to be separated for other Uses. Gentlemens Court Yards are often pitch'd with them; tho' they make but a loose disagreeable Pavement.

The Value of these, like that of the Gravel itself, depends upon the Situation of the Place, and the Demand.

In some few Places, and particularly in Buckinghamshire, I have seen the Farmers dressing their Clay Land with Gravel. I went up to an old Husbandman whom I saw assisting in strewing Gravel thin over one of these Lands, and he assured me it had been done by a Neighbour with good Success.

The Land was a solid red Clay without Sand or Stone, and the Gravel was a very loamy Sort well screen'd, so that there was not a Stone so big as a Walnut among it. However strange the Practice might appear at first: for indeed it look'd as odd to me as it possibly can to my Reader, yet on considering these Points, it was not foreign to Reason.

The Stones in it were mostly ragged little Flints, and along with these there was a great deal of a marley Loam: for the Loam that is among Gravel, is usual of the marley Kind: these Flints broke the Substance of the Clay, and made way for the Sand, which broke and divided it still farther; and so let in the Marle that enriched it, at the same Time the Openness of the Structure gave Admission to the Sun, Air and Rains.

The old Farmer told me that all he should do more to his Land, was giving it a small sprinkling of Dung from his Yard toward Michaelmas; and he assur'd me this was the Method follow'd by his Neighbour, who had by that Means got good Crops of Wheat from a Piece of Ground, which had many Years had the Character of one of the worst Pieces of Land in the Hundred.



Gravel is one of the great Advantages we have in this Country over most others for making Walks; and it is from this, and our Grass or Green Sward, which is in the same manner superior to that of all other Nations, that we are able to add a Beauty to the Walks in our Gardens, which no other People can.

Now so far as regards the Gravel, this Advantage is owing in a great Measure to the Mixture of those other Ingredients Loam and Sand among the Pebbles, than to the Pebbles themselves. Other Countries have Heaps and Beds of small Stones, but they are deficient in these Admixtures which make them bind.

But as famous as we are in ENGLAND for Gravel, it is not in every Part that we have it, or that the People know it so well. They even give its Name to other Things, altogether different in their Nature.

In some of the most western Counties there is hardly such a Thing to be found as a Pebble: yet they have what they call Gravel. And in NORTHAMPTONSHIRE, where they have Pebbles enough, they yet give this Name to other Mixtures. At FARNDON in that County, their Gravel is made up of flat Pieces of Slate Stone more than Pebbles; the Gravel at UPTON is made up wholly of such Pieces of Stone, without a Pebble among them: at ECTON they call a reddish Sand, with some flat Pieces of a red Stone among it, Gravel; and at DESBOROUGH they give the same Name to Quantities of petrified Sea Shells among Sand. As they use these several Matters instead of Gravel, they give them its Name, but it does not properly belong to any of them.

The Gravels in ENGLAND are in Colour yellow, reddish, brown or whitish: the first are preferred, but there is a particular Beauty in the last Kind. There are Pebbles among them of pure Crystal, some as clear as Glass, others less pure and whitish. I have taken up several of these in a Gravel Pit near the Duke of PORTLAND's; and on one I have a Seal engrav'd: it is equal to any Crystal in the World.

The Gravel in KENT is often compos'd only of loose Pebbles. In SUSSEX I have seen a great deal made up of Pebbles and Sand only, which lies loose in Walks, and never binds; in BEDFORDSHIRE I have met with it too loamy, and this is a great Fault. Walks made with this are dirty after Rain, and are apt to be presently over-run with Weeds. A due Proportion of Loam and Sand, with the Flints and Pebbles, is the Perfection of a Gravel.

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## CHAP. V.

### Of the Uses of Chalk.

FEW of the Earths serve to more considerable Purposes than Chalk. It is therefore by no Means to the Owner's Disadvantage to have it upon his Land any where: often it is a Subject of great Profit. In some Counties it is scarce, others are over-run with it. In the first a good Bed of Chalk is an Estate: and even in the others it has its Value.

A great Quantity of Lime is made of Chalk. It does not make the best Lime, but it calcines the easiest, and can therefore be sold cheaper, which never fails to procure Custom.

The Use of Chalk as a Manure is also abundantly known, and occasions a great Consumption of it. In this Light it has been mention'd already under the Articles of those several Soils which it is best suited to improve; and it will be mentioned more at large hereafter under the Head of Manures. It is however necessary to name it in these Respects under this general Consideration. These frequent Necessities of mentioning the same Thing endanger Repetitions; but it shall be our Care to avoid them as much as possible.

That the Owner may know to which of these two general Purposes Lime, or Manure in its own State, his Chalk is best suited, he must examine its Nature. A small Degree of Care will discover this; for in general, he will find the hard and stony Chalks are fit for Lime; and the soft and marley ones for Manure in their natural Form: I say in their natural Form, because the hardest of them when reduced to Lime, serve also for Manure.

These are Articles no farther to be consider'd in their Place: and the present Chapter will be the shorter, because of the Necessity of treating largely of the Subject elsewhere.

Whiting, which is of so many Uses in the common Affairs of Life, is made from Chalk. It is no other indeed than Chalk broke from its hard and firm Nature, and reduced to a fine Powder like Flower, which having been suspended in Water, forms itself into Cakes as that Water dries away; and is fit for the Use of the White-washer and others.

Chalk is also valuable on Account of its Qualities as a Medicine. They find in Chalk Pits certain roundish shelly Substances, which they call Chalk Eggs. These are hollow, and full of a Chalk as fine as Whiting, and altogether like it. The Curious say these Shells once belong'd to the Sea Eggs, or Sea Urchins, as they are called, a Sort of Shell Fish common enough on our Shores; and that they have been petrified and filled thus with fine Chalk ever since NOAH's Flood.

I have been told that the Chymists and Apothecaries use Chalk oftener than they should: and that those white Cakes that are set up in Glasses at their Windows in LONDON, with the Name of Pearls, and the like, are only Chalk. They look very like little Whiting Balls: very probably they are no other. How far this Deceit is prejudicial to the Healths and Lives of those that take them, I shall not enquire; not being willing to speak of Things I do not understand.

They are very happy in KENT, and some other Counties, who have the Chalk lying just under Ground, or in the Cliffs, so that they have nothing to do but to tear it down and use it. In many other Counties where they have as much Necessity for it, it lies at great Depths.

In some of these Places they dig Wells for it, there being no Water till they come to a great Depth, so that they take up a vast deal without



out Disturbance. In other Counties I have seen them digging for it as they do in Mines, and drawing it up in Buckets: in such Places it bears a Price.

They have a very ingenious Method in some Parts of KENT, of getting down their Chalk where it is in the Cliffs, or on the Sides of Hills, which is well worth practising in all other Parts where this Commodity lies in a like Situation. In the first Place, they undermine a Parcel of Chalk to a little Depth at the Bottom. When this is done, they go to the Top and cut a small Trench along, as far from the Edge as the Depth of the undermining: they fill this Trench with Water in the Evening, and the Effect is, that a great Flake of Chalk of two Foot or more in Thickness, and of the whole Breadth of the Pit falls off before Morning. This does best in the hard and stony Chalks.

We hear of two other Kinds of Chalk among the Painters, the one called black Chalk, and the other red Chalk. It might be suppos'd that these were common Chalks ting'd to those Colours, but that is not the Case: they are altogether different Substances, and are found not in great Beds, but in Lumps: where they happen to be thrown up in digging, they are worth saving; but there is no knowing where to expect them.

Hitherto we have been considering those Substances which frequently make the Foundation of Soils, as they are useful to other Purposes beside those of Husbandry. We have in this Light gone through five of these: there remains one more, that is, Mould; but as the natural and immediate Use of that is for Husbandry, it would be idle to consider it in other Lights.

It will be proper therefore that we now advance to certain other Substances, which the Owner may find either by Accident, or by his Industry in his Land, and which may be very profitable.

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## CHAP. VI.

### Of Fullers Earth.

IT would be natural in this Place to give the Preference over all other Things here to be treated of, to Marle: as it is more frequent than the others, more abundant in Quantity wherever found, and more generally useful; but that will come into Consideration in another Place, under the Article of Manures: and to avoid any Repetition, nothing shall be said of it here. I shall therefore proceed to treat of Fullers Earth; a Commodity of Value, and of the utmost Importance in that great Article our Woollen Manufactory. It is not only an Advantage to the Owner who shall find this on his Land, but to the Country.

Fullers Earth is at present dug in very few Parts of this Kingdom: but wheresoever it is found the Profit is very great. The Nation is at this Time in a Manner supplied from a few Pits in BEDFORDSHIRE; but I have more than once met with this valuable Earth in other Counties.

In the first Place, let those who may reap the Advantage of it, know perfectly what it is. Fullers Earth is a genuine Marle, and is the finest of all the known Kinds. If the Price would allow, doubtless it would exceed all other Sorts in the Improvement of Land; none is so pure and free from Admixture, none is so soft and mellow; and as to its breaking with the Weather, we know very well that it falls to Powder in a few Moments by the Effect of Water.

Tho' Fullers Earth will never be used as a Manure, yet even the Knowledge of it is not without its Use: for foul and coarse Fullers Earth is found in Places where the fine and pure is not; and the Owner will now know how to value it.

I mention'd the BUCKINGHAMSHIRE Farmer's dressing his Ground with Gravel. I have in many Places found a coarse Kind of Fullers Earth in Gravel Pits: I cannot say I distinguish'd any of it in the Parcels of Gravel I saw there; but if there were any Quantity of it as there might be in other Depths of the Gravel Pit, we see the Fertility in part accounted for on this Principle. I thought at that Time this Farmer deserved particular Praise for doing what so few of his Profession ever will, and especially of the old ones, that is, use a new Method.

What I mean by a coarse Kind of Fullers Earth found in Gravel Pits is this. There often lie among the Gravel in different Counties, Lumps as big as one's Fist, or of half that Bigness, of a greyish coarse earthy Substance. Sometimes I have seen these lie irregularly, and in some Places I have seen a Streak of them in the Side of the Pit run perpendicular; though seldom in an exact strait Line from the Top of the Bed of Gravel down as far as the Workmen dig.

This coarse Earth when examin'd, contains usually a sharp Sand, and some Clay, but it has a soapy Softness withal, that to a Person used to handle Fullers Earth, will be sure to bring that into his Mind.

I have put these Lumps many Times into Water, where they break almost directly, and they form three Settlements. At the Bottom there lies a sharp Sand, over that is a thin Settlement of yellow or brown Clay, and at the Top of these a loose Covering of an Olive colour'd light, crumbly and moulding Matter, which is perfectly the same with Fullers Earth when broke in Water. If the whole be shook or stir'd together ever so often, the Settlement always divides itself into three Parts in this Manner.

Now I am sure from many Trials, that this upper Settlement which looks so like Fullers Earth in a State of Wetness, is Fullers Earth in Reality; upon this it will be worth while to make some Observations.

In the first Place, where should any Thing be expected to be found pure and entire, but where we already see it in a more imperfect State. Therefore in whatever Lands these Lumps shall be found, it would be well to look heedfully all over them for more and finer, in order to direct a better Search by digging where there is a Prospect.

Secondly,



Secondly, where there are Beds of any Kind of Earth pure at some Depth, we see the same Things in a fouler State towards the Surface: thus clayey Soils generally lie over Beds of pure Clay; these Soils being no other than the same Clay which will be found pure at a greater Depth, mix'd with other Earths near the Surface: and it is the same of the others.

Therefore when we find this foul Kind of Fullers Earth near the Surface of the Ground in Gravel Pits, it is very reasonable to believe the same Substance may be found altogether pure and entire, deeper down.

I would not advise for this Reason, the digging in Search of Fullers Earth wherever some of these Lumps shall be found, because that would be a random Search: such Marks of valuable Things under Ground, being often scatter'd to a great Distance about the Surface. But when the Owner of a Piece of Land sees one of these Veins I have spoken of, running strait down a Gravel Pit to the Depth of the digging; I think it would be worth while to venture some Expence in following it deeper; and seeing in what it ends.

The Miners often trace a Vein of Ore in this Manner through the hardest Rock, from the Thickness of a Thread till it enlarges into a great Body; why should not the same Success attend such a Trial here.

I remember once to have seen in a Gravel Pit upon my own Land, a Vein of fine Mould thus running strait down among the Stones. This did not begin small and increase in Bigness; on the contrary, it was widest at the Top or Surface of the Ground, and grew smaller all the Way. I had seen these before in other Places where I had no Right to dig; but here I order'd it to be follow'd. At about thirteen Foot it terminated in a thick Bed of Garden Mould. The whole Descent seem'd to have been a Kind of Funnel, through which this Mould ran into the hollow underneath, filling it up, and forming a Layer of Mould, a Thing very unusual at that Depth.

I mention this to shew how well such a Vein of Fullers Earth, if one should be met with, would be worth following. We know nothing of the Ways by which People were led to the Knowledge of those Beds that have so long been dug for Fullers Earth: perhaps it was in some such Manner.

Of this I am sure, that if the Farmer or Owner would frequently follow the Plow and the Spade with his Eye, he would find great Advantage.

This is not all the Reason we have to expect Fullers Earth in other Places, beside those where it is at present dug.

At WENDON in NORTHAMPTONSHIRE, there is found in many Pits, an Earth of an irregular and mixt Colour, yellowish in some Places, and bluish in others. This breaks in Water just like Fullers Earth, and takes Spots out of Cloaths, as the People every Day experience. It is not altogether pure, nor does it seem of quite so scouring or penetrating a Nature as Fullers Earth: but it comes very near it, and serves in its Place for ordinary Purposes.

Now blue and yellow mix'd, every one knows

make green. These dingy Earths therefore would probably when mix'd, make an olive Colour; and if pure, would more resemble Fullers Earth. This is not the only Place where I have seen this foul and half-mixed Earth: is it not very probable that the same Earth more pure and better blended is to be found a little deeper. Such a one would be right Fullers Earth; but no-body digs to try.

Dr. PLOT in his Natural History of STAFFORDSHIRE, says, That near STAFFOLD in that County, he had met with Fullers Earth very much like that of WOOBORN in BEDFORDSHIRE, but in little Quantity. Now if some broken Masses of this lie near the Surface, who will doubt but there are more at greater Depths. Probably there are Beds of it there, and in the other Places I have mention'd, and there only wants Industry and Spirit to open the Way to a Fortune.

I would advise the Land Owner and Farmer for the future, to make themselves well acquainted not only with Fullers Earth, but the others to be named hereafter, by the Sight and Touch; that they may know when any Thing like them happens to be thrown up: I say any Thing like them, for they are not to expect to find any of these Commodities pure and perfect when near the Surface: they can only expect coarse Pieces there which may tempt them to seek farther; they are to expect no more than this, for it is all Nature gives for their Information.



## CHAP. VII.

### Of Ochre.

**O**CHRE is an Earth used by Painters and many other Artificers; and is of very considerable Value. Many fine Kinds of it are produced in ENGLAND, and that in very large Quantities. It is an Estate to the Owner wherever it is found; and I am sensible, that it is to be dug in many Places, where at present the Possessor of the Ground has no such Expectation.

Ochre is of several Kinds: the two principal are yellow and red. A great deal of the yellow Ochre is converted into red by burning, for all yellow Ochre grows red on being put into the Fire: but beside this, there is natural red Ochre in Abundance.

Beside these two principal Kinds used by the Painters, of each of which there are several Subdivisions; there are two others used by Glovers in some Parts of the Kingdom, and not so well known as they deserve to be: in others there are a purple and an ash-colour'd Kind; and to these four I may reasonably add a fifth, which is of a dusky Straw Colour, and serves for the rubbing upon Leather Breeches, and Buff Belts.

It is not to be imagin'd, that every colour'd Earth is an Ochre: on the contrary, an Ochre is an Earth of a distinct Kind from all others. As Clay differs from Chalk, and as might be instanced of many others; so Ochre differs in its very Nature from any other Kind that can be named. There are indeed clayey Ochres, but they



they are the least valuable Kinds. Ochre in its proper Condition, is light, brittle, dusty, and fine between the Fingers; and such are all those I have named.

As to the yellow Ochre, which is the most universal Commodity, that is dug principally on SHOTOVER HILLS near OXFORD: not only all ENGLAND, but all EUROPE is in a Manner supplied from this Spot; but the Owner of a Piece of Land where Ochre shall be found, needs not for this neglect digging it. For tho' People are principally supplied from OXFORDSHIRE with it; a great deal is sent to LONDON from other Places; and wherever it shall be found, a Market may be had for it.

The ingenious DUTCH have a great deal of our Ochre from OXFORDSHIRE, which they partly use for their own Purposes, and partly send over to us again after they have manag'd it different Ways, under the Name of foreign.

Yellow Ochre usually lies under Beds of Clay and Sand: but it generally discovers itself by Lumps lodg'd here and there among those Beds: so that when such are found among Clay or Sand, of a good Colour, and in any Quantity, it is worth while to be at some Pains and Cost to see farther.

The yellow Ochre is divided into two Kinds in these Pits, one called Stone Ochre, and the other Clay Ochre; one is ready for Use just as it is dug, being naturally pure and fine; but the other is foul and irregularly colour'd; so that they soak it in Water to get out the Sand, and then beat it into Cakes.

In many Places yellow Ochre is found in little Lumps among Gravel, and of different Colours. They pick such up in BEDFORDSHIRE and other Counties, and the Glovers use it. I have often seen this of fine Colours.

In NORTHAMPTONSHIRE, and several other Counties, they have grey or ash-colour'd Ochre; the purple is not so common, but they find it in the first mention'd County. Particularly in a Pit at THINGDON, there is a thin Stratum of it. 'Tis us'd only by the Glovers, and therefore sells at a small Price: but it is worth the Notice of Painters, for it is a beautiful Colour, not unlike what is called Persian red; and mixes well with Oil as I have tried many Times.

It is not difficult to make a guess where Ochre is under the other Beds, by these Tokens it gives of itself nearer the Surfaces; and 'tis often worth the pursuing at some Expence. But it is not only the Want of attending to these Marks, that is to be charg'd upon many of the Owners of Lands, I have known a Bed of yellow Ochre cut through in digging for Water; and neither the Farmer nor Landlord have known, that the yellow Matter they saw thrown up was of any the least Value.

The Chapter of Ochre is not to be clos'd without mentioning what is called Reddle. This is not indeed properly of the Ochre Kind, but a Marle of a deep and strong red Colour; but as it is vulgarly called an Ochre, and by some red Ochre, as if there were no other, it was necessary to mention it here.

The finest of this Reddle, and the greatest Quantity, is dug in DERBYSHIRE, from whence

it is sent to LONDON, and to other Parts of the Kingdom, where so large a Quantity of it is us'd, that tho' it sells at a small Price, the Value is upon the whole very considerable.

Beside the common Use in marking of Sheep, this Earth is put to many others among the Colourmen, being the Foundation of a great many of those Compositions that serve for large Work.

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## C H A P. VIII.

### Of Peat.

**P**EAT, or as it is called in some Places, Turf, is a very particular Substance. It is sufficiently known by Sight in the Places where it is burnt, for it is the common Fuel of many Counties; but I have found many even in those Places strangely ignorant of its Nature: and those in remote Counties very little acquainted with it more than by Name.

It is not much a wonder that those who never saw Peat except in the dry State, should be ignorant of its Origin. It then is of considerable Hardness in many Kinds; but the most solid Peat cuts easily with a Spade in the digging, being soft and tender there, though it get Firmness in drying.

Peat, or as it may be called Peat Earth, distinguishing that which lies on the Ground from that which is dug, consists of a bituminous Matter, full of various Parts of Plants. For this Reason when cut up and dry'd, it readily takes Fire, and burns very freely.

It is of two Kinds. The one is taken from the Tops, the Sides, or the Bottoms of Hills; the other is dug up in a level Country. The Peat of LANCASHIRE is of the first Kind; and that of the Fens, as of LINCOLNSHIRE, and the like Places is of the other. They differ in Colour, that of the hilly Countries being pale; and also in Consistence, as it is somewhat softer. The Peat of the Fens being compact, of a deep blackish brown, the other lighter, looser, and of a paler Hue.

These are but trivial Differences, and in all other Respects they are perfectly alike. The bituminous Matter is the same in both, and the Parts and Remains of Plants are of the same Kind, and preserved in a like Manner.

It is in many Places of great Consequence to the Owner of Land, to know whether Peat may be cut in it. This, as it lies so near the Surface, and as the Soil about it usually so easily discovers it, is not so often over look'd as Ochres, and the rest of those valuable Earths that are hidden at greater Depths; yet I have seen where a great deal has been lost by not attending to these obvious Discoveries of Nature.

Let all those therefore who live in Places where Peat is at all likely to be found, acquaint themselves with its Nature, with the Marks of the Soil that contains it; and with its Value. That they may judge where it is lodged, and whether worth taking up.

The Fen Lands are the Places where Peat is most frequently found, yet it is not universally laid



laid under all fenny Soils. Some Parts of the Fens in the Isle of ELY, in LINCOLNSHIRE, and NORTHAMPTONSHIRE, afford it in great Plenty and Perfection. Other Parts of the same Fens none at all. Very frequently the Farmer lights on it in digging his Ditches, which are the common Fence in that Country: and then the Peat very well pays for all the Labour of digging.

The right Peat Earth is a light spongy tough Substance of a blackish, or a darker, or lighter brown Colour. It is full of fibrous Roots of Plants, together with flaggy Leaves, and hollow Stalks like Reeds; and has often many other Parts of Plants in it. These Vegetable Matters are so abundant in the Peat Earth, that it seems as it were compos'd of them.

It lies at small Depths in the Earth, but never on the Surface of it, as some from the Name Turf have been idly led to imagine.

It never lies immediately under the Turf or Sward, but always has a greater or lesser Depth of the Soil between. This Soil is commonly the black moory Land, or pure Mould of the Fens; and this is so unlike in its Nature to the Peat itself, that if it be taken up with it, as is sometimes done in the Cutting, and Peat be laid to dry with a Quantity of the Mould upon them, it always falls off.

Good Peat Earth, as it lies in the Ground, cuts soft and easy, so that they form it into Shape as they dig it. When dry'd, the Peat are tough and firm, they are not easily broken, and the bituminous Part between the Stalks and leafy Remains of Plants is very hard, and where it is broken, looks smooth and glossy like Pitch.

The blacker the Peat is, the better it is always reckon'd: 'tis for that Reason the Peat of the Fen Lands is preferr'd to that of hilly Countries. When it is of a pale brown, or redish and soft, it does not burn so well. Sometimes there is Clay or other Earth among it, and then it is of very little Value.

It is used as the common Firing in Fen Countries, and burns agreeably enough: it has some Smell; but that is accounted wholesome.

Peat is just of a contrary Nature to Manure. When the Surface of it is laid bare, nothing grows on it, except sometimes a few Rushes; and when the Soil that lies over it is plowed, the Farmers take Care never to cut upon the Turf or Peat if it lie shallow; for they affirm from Experience, that its Mixture with the Soil renders it barren.

A soft spongy Soil, shaking as it is trod, with a good black Mould under the Turf, is the Mark of Peat Earth underneath. Not that it is always in such Lands, but that is its usual Situation.

It is found from a Foot to four or five under the Surface, and often the Moor or Bed of it is of considerable Thickness. It retains wet a long Time, and therefore is so easy to cut in the Bed; for when dry it becomes hard and stubborn, as before observed.

The best Season for cutting Peat is April and May: and the Peat must be cut larger than they are expected to be when dry, for they com-

monly shrink one fourth Part in the drying.

The usual Situation of Peat is this; first there is a heavy thick Sod, that gives Way under the Feet; then a moist black moory Soil, of a Foot or more in depth; then comes the Peat, which is two, three or more Feet in depth; and under this is a Bed of Clay.

This is the Reason the Peat keeps so moist in the Pit. The black light Soil lets Wet easily through; and it freely penetrates the Peat, but the Clay at Bottom stops it, so it swells, grows spongy, and lifts up the Soil, making it shake and give Way on treading.

The Grass over the Peat Moors is usually coarse and harsh; and where the Peat Moor is thickest, there the Grass is always worst. Where this Moor or Bed of Peat is very thick, as it will be in some Places five Foot or more, they don't cut the whole but only the upper Part, two or three Feet at farthest, into Peat. The under Part is usually in these thick Beds too moist for Use.

In some Places there is a Bed of Sand instead of a Bed of Clay under the Peat Moor; but this is not so common, nor is the Peat usually so good where this is the Case, as where there is a firm Clay.

In the Fens they have two other Sorts of Fuel of the Peat Kind, but inferior in Value, the one they call Sefs, and the other Hods.

The Sefs is cut from the upper Part of the Beds of Peat. It consists of a light brittle Earth, with little of the black Bitumen in it, but with the Parts of Plants in the same Manner as the other. The Hods are cut out of the lowest Part of the Peat Bed; but it is not every Peat Bed that affords either. The Sefs only lies on the drier Moors; and the Hods, which stink in burning, come from the moist Bottoms of thick Beds.

This Bed of mix'd Matter, partly bituminous and partly vegetable, which forms the Peat, has been suppos'd owing to the Sediments of great Floods, which have remain'd a long Time upon the low Lands; but that is not the Case. Bituminous Matter, like Pitch, does not settle from Floods: beside the same Matter is found in the same Form impacted with Roots, and making regular Beds of Peat Earth at the Tops of Hills and on their Sides; and these are Places that can never have been overflow'd.

From this I mean to encourage the Farmer, not to suppose Peat is to be found only in one Situation; but wherever he finds a Piece of Ground that shakes under his Feet, and is covered with coarse Grass, and that has a black Mould under the Sward, to dig a Foot or two, and see whether he do not find Peat Earth at that Depth.

It is a Fuel very well worth using wherever it can be had, it heats Ovens better than any other: it is cheaper than any, and its Ashes are valuable as Manure, though in its natural State it is of all Things the most an Enemy to Fertility.

One singular Use of Peat is the keeping on Fire a great while; a Piece of it lighted at one End, and diped in Water at the other, will keep fire all Day.



It is excellent for many of the nicer Chymical Operations, and if it were to be had universally, would be called for more than is imagined. I would therefore have him who can dig it, not be negligent because it is not known or commonly us'd about the Place. Let him dig and dry it, and he will soon find Buyers.

What may tempt the Owner of Land to search for this valuable Commodity more generally than is done at present, is, That I can assure him from my own Experience, that other Places beside Hills and Fens afford it. I have seen it cut through in many Meadows, when they were only digging the Trenches to drain them; and no-body regarded it. At MEARS ASHBY in NORTHAMPTONSHIRE, and at GRAFTON UNDERWOOD in the same County, they dig excellent Peat, though quite out of the Fens, and far enough from the Hills: it lies at about fifteen Inches under the Sward, with a rich black Mould between; and runs to a great Depth. The only Mark of its being in these Pastures, is a little Unfirmness of the Ground, and this may lead the Owner of Land to seek for it in many Places, where the Situation does not naturally, at least according to the common Opinion, make it expected.

At the same Time that I recommend the Search of the right Peat in Places where it has not before been found, it is proper I caution the Undertaker against using his Labour upon a wrong Sort, which has been lately try'd in some Places. I don't know whether it was from Ignorance of what Peat truly is, or from a Supposition that Turf, or the outer Covering of boggy Land would do as well: but THOMAS RENOLLS my Neighbour cut the upper Turf of a boggy Ground into long square Pieces like Peat, and dry'd them for burning. He told me, when I represented the Folly of this Project, that a Relation of his had done the same successfully.

Whether his Relation told him what was false, or he did not understand him, I cannot say, but the Event was what might be expected: the Turf was light and fuzzy, and did not burn

well, nor was worth any Thing. It was much like the Sefs already describ'd, only worse. These wet Places are always cover'd with a Turf that is very full of Roots, but there is none of the bituminous Matter. So that this is not Peat, but quite another Thing: neither was there upon Trial found any Peat Earth at the Bottom of this Bog.

It is proper I here warn the Person who shall find Peat on his Land of another Error. It is commonly supposed the Peat Earth grows: but this is a Mistake. When he has once cut up the Quantity any Place yields, he must not expect any more for ever.

In LINCOLNSHIRE where they dig great Quantities, when they have cleared one Dike as they call it, they open another: and they throw into the first the Turf and Mould out of the other. It is pretended this will yield more Peat in twenty Years, but I have seen it try'd after twenty five or thirty Years, according to good Authority, and without the least Success, when the Peat Bed is once dug up it never is renewed.

The curing of Peat is a Thing of no great Difficulty, they are cut in the first Summer Months in the Shape of large Bricks, and are laid singly upon the Earth to dry. They are very soft when first dug, but they soon lose part of their Moisture, and harden in Proportion. They are to be turn'd twice or three Times while they lie single, and after they have thus got a tolerable first drying, they are to be piled up in Heaps like a Wheelright's Felleys, with Spaces for the Air to blow in between: in this Manner they get thoroughly dry, and are fitted for the Fire.

The Husbandman must keep in Mind the Difference between Peat, and the common Turf of the Ground, not only for Fuel, but as us'd for Manure: for as the Peat is much superior to any Kind of upper Turf for Firing, so on the other hand, the upper Turf of moory Ground is better for burning to Ashes for Manure than Peat.

End of the Appendix to the FIRST BOOK.





A  
COMPLEAT BODY  
OF  
HUSBANDRY.

BOOK II.

Of MANURES. In TWO PARTS.

I. Of NATURAL MANURES.

CHAP.

1. Of the Nature of Marle.
2. Of the several Kinds of pure, or unmixed Marles.
3. Of the several Kinds of impure or mixed Marles.
4. Of certain Marles found in particular Counties.
5. Of seeking for Marle.
6. Of suiting the Marle to the Land.
7. Of the Manner of using Marle.
8. Of the vast Fertility of marled Lands.
9. Of the Use of Mud as a Manure.
10. Of the Use of Clay as a Manure.
11. Of the Use of Loam as a Manure.
12. Of the Use of Sand as a Manure.
13. Of the Use of Gravel as a Manure.
14. Of the Use of Stone as a Manure.
15. Of the Use of Chalk as a Manure.
16. Of the Use of Salt as a Manure.
17. Of the Use of Sea-Weeds as a Manure.
18. Of the Use of Sea Shells, and their Spawn, as Manure.
19. Of Parts of Trees and Plants, used as Manure.
20. Of Parts of Animals, used as Manure.

CHAP.

21. Of Dung in general as Manure.
22. Of Horse-Dung in general.
23. Of Horse-Dung used singly or alone.
24. Of Horse-Dung made into Compost.
25. Of the laying on of Dung.
26. Of the Virtue and Quantity of Horse Dung.
27. Of Cow Dung.
28. Of Sheeps Dung.
29. Of Hogs Dung.
30. Of Pigeons Dung.
31. Of the Dung of Poultry.
32. Of human Excrement.
33. Of Urine.
34. Of Rags.

II. Of ARTIFICIAL MANURES.

35. Of Lime; its Materials, and Manner of burning it.
36. Of the Manner of using Lime as a Manure.
37. Of Soot.
38. Of Ashes.
39. Of Burnbaiting.
40. Of the several Kinds of Bastard Burnbaiting.

The INTRODUCTION.

*Of Manures in general.*

**A**FTER a thorough Consideration of the Soil, both with respect to its Cultivation and other Uses; it is proper we lead the Farmer to the Understanding of Manures, by which the Improvements of Cultivation are in a great Measure

N<sup>o</sup> 4.

brought about: the breaking the Land by the Plow, and the altering and enriching it by these Dressings, being the two Articles on which all the Amendment of a Soil depends.

The Business of the succeeding Book is to treat of Manures; and that not slightly or imperfectly. Care shall be taken to draw together the whole Number of these; to arrange them naturally, and present them one by one before the eye of him who is to use them.

M

Nor



Nor shall we be content with informing him of the Effect each has upon that Kind of Land to which it is suited; but he shall know how it acts: informing his Judgment, instead of trusting all to his Memory.

This is our Design in the present Part of the Work: we are sensible that the Undertaking is large, as well as difficult; but we have been favoured with so many Communications upon the Subject, that we hope in some Degree, to proportion the Execution to the Design.

In treating on the several Manures, many must be call'd up again which have been nam'd already; but we hope the Caution that has been used in methodizing the Papers, will prevent tedious or needless Repetitions.

In the Arrangement of these several Articles, we shall first make a general Division into the natural and artificial Manures: among which, the Use now made of some of the natural

Kinds would have appear'd as strange to an earlier Practitioner in Husbandry, as the Invention of many of the others.

In treating of the Uses of the several Kinds, and their proper Application, we shall throw aside Theory and Conjecture, building all upon Experience. If the Farmer be not perfectly instructed as to the particular Kinds of Lands which demand particular Dressings, it wou'd have been better for him if those Manures had never been invented.

A Soil may be render'd worse than it naturally is by bad Management; as certainly as it may be improved by good: but as we shall insert nothing here but what is supported by repeated Experience, we wish the Farmer to prove so much his own Friend, as to give what may appear ever so new to him, if it suit his Purpose, a fair Trial.

## BOOK II. PART I.

### Of NATURAL MANURES.

#### CHAP. I.

##### *Of the Nature of Marle.*

**I**N treating of the natural Manures, 'tis fit we begin with the most considerable, which is Marle. It is indeed in all Respects superior to the Generality of the others: it suits many different Kinds of Lands; and its Effects in rendering them fruitful are not more surprizing than they are lasting.

Marle is a Treasure to the Farmer whereforever it is found; and there is no Country in the World where there is more of it than in ENGLAND: yet there are few Places in which it is known to lie. The Industry of those who deal in Husbandry has not been in any Thing so slack, as in the Searching after this valuable Commodity.

We shall endeavour to awaken them to a Sense of their Interest, by shewing its Value: and to assist them in the Search after it we shall endeavour to make it known to them by Sight and Feeling in its several Appearances, for these differ greatly. After this, to prevent Mistakes in the Application, the several Kinds of Marle shall be distinguish'd, and the particular Kind of Land shewn, to which each properly belongs.

In looking into what has been formerly known concerning the Marles, one is shocked to see that Husbandry has declined in this material Respect in ENGLAND. Our Ancestors two thousand Years ago were well acquainted with their Possession of this Treasure, and its Use. The old Latin Writers celebrate the Marles of ENGLAND, and tell us that the Lands were greatly enriched by them. They enumerate several Kinds: and seem much better acquainted with their Nature and Qualities, than the Generality of our present Farmers.

We see what Treasures Marle Pits at this Time prove where they are open'd, and what Advantage the Land has from that Dressing. Let us endeavour to find them in more Places, and make that Benefit universal.

In order to the Husbandman's finding Marles upon his Land, he must first have some Knowledge of them. The very finest Kinds have often been thrown up accidentally in digging on other Occasions, and no one has known them. The Fields have languished for want of what they contain'd in their own Bowels thro' the Ignorance of their Owner.

Marle is of several Kinds, and differs greatly in Appearance; but to him who will carry a general Knowledge of it in his Head, it may be always known in whatever Form.

Marle, like other Earths, may be pure or foul: for those Beds of Matter which lie in the Earth are subject to Mixtures as well as those on the Surface, tho' not so frequently: and the deeper Marle lies, usually the purer it is.

We shall first then divide the Marles into two Kinds, the pure and the mixt. The pure Marles all agree in their Texture; their Difference being only in the Degree of Hardness, and in the Colour.

Pure Marle is a Substance not unlike Fullers Earth. It is soft and fatty to the Touch, it is not tough like Clay, nor dusty like Ochre, nor sandy like Loam, but is of a tender fine Nature, unlike all other Sorts of Earths.

When a Farmer finds a Piece of Earth of this Kind, whether it be thrown up in digging a Well, or by whatever other Accident, let its Colour be what it will, he may depend upon it 'tis a Marle. In order to be more confirm'd, let him throw a Piece of it into a Basin of Water, and he will find it swell like Fullers Earth, and crumble in the same Manner of it-  
self



self to Pieces. This is a certain Confirmation. The harder and more compact Kinds break slower, the soft and loose ones quicker: some almost immediately. But in whatever Manner it happens, this join'd to the others is a sure Proof that the Earth under Examination is a Marle: and let him who has fallen by Chance upon a Piece of it, dig in Search of the Treasure.

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## C H A P. II.

### *Of the several Kinds of pure or unmixed Marles.*

OF these pure Marles there are four principal Kinds, distinguish'd according to their Colours.

A white,	A red,
A yellow,	A blue;

there is also a black, but it is less common.

These are to be distinguish'd under the Name of pure Marles of those Colours; for there are of the foul and coarser Kinds of the same Colours.

I have Experience on my Side in saying, that these excellent Marles are all more common than is suppos'd. I have seen the blue Marle thrown up in BUCKINGHAMSHIRE, and the red in Abundance in WARWICKSHIRE, as fine as the best in SUSSEX or KENT. And not very many Years since in WORCESTERSHIRE, as much white Marle was discovered among the Rubbish where they were sinking after Salt Springs, as returned a great Part of the Expence.

In short, though there are but a few Counties in which Marle has been found, and is in Use in ENGLAND, I believe there are very few where it may not be discovered; nor is any Thing so well worth the Search.

There are found in different Places Marles of these several Colours, varying in their Texture and Hardness; but, in general, the white or whitish are the softest and lightest, and the blue are the firmest and heaviest.

For this Reason the white is generally used for Pasture Grounds, and the blue for Corn Lands. This is the general Practice in KENT and SUSSEX, where the Marles are most frequent, and their Use is best understood; the white being there almost universally of a loose crumbly Texture, and the blue of a more compact and firm.

This Custom however is not to be establish'd into a Law to the Farmer. Tho' in those Counties where they have Choice, they use the softest Marles for Pasture, because they dissolve the most freely; and the harder for plow'd Lands, where they are more assisted by Tillage. The Farmer, who has either of these Kinds, may use it indifferently on both Occasions, in this Manner.

If it be the blue firm Kind, or any other of the compact Sorts, let him lay it upon his Corn Land early in the Season, that the Weather may mellow it before the last Plowing: if it be for Pasture Ground, let him in the same manner lay it on in Time, spreading it thin. If it be the

white, or any other of the loose and crumbly Kinds, it need not be laid on either till late, because it breaks and dissolves almost as soon as it is expos'd to the Weather.

The Colour of Marle is no certain Proof of its compact, or crumbly Nature; but, in general, the blue is firmest, the white softest, and the red and yellow are of a middle Degree between both.

At BLUNDS-COURT, and in the Parish of SHIP-LAKE, both in OXFORDSHIRE, there is dug a whitish Marle, of the fine crumbly Kind. It is used both on Corn Lands and Pasture Grounds with great Success; and they lay it on at any time of the Year they please, for it melts into the Earth like Cream, almost as soon as it is spread.

In several Places in WARWICKSHIRE I have seen a blue Marle, the same that is so much esteemed in SUSSEX. This is at first as firm as Clay. This Kind should be laid on Corn Lands at the Beginning of Winter, that it may be broke by the Frosts and Rains.

I have mentioned that the Use of Marle was well known in Husbandry in this Country in the Time of the ROMANS. There is also plain Proof that it has been used long since that also in many Places, where the Farmers know nothing of it now. A melancholy Proof that the Art of Husbandry, which is so well worthy to be improved, has declined instead of advancing in the late Ages.

As an Instance of this Use of Marle in Places where though it is wanted, it is not employ'd at present, I may cite the common Report of the People of NORTHAMPTONSHIRE. In CRICKFIELD in that County, there are a great many old Hollows, which they at this Time call Marle Pits or Marlow Pits, and say were dug for Marle. In the Lordship of WINWICK, in the same County, are many other such Holes, all which the Country People have heard their Fathers say were dug for Marle to improve the Land: and old Deeds of Estates mention Marlaria, or Marle Pits, as Articles of Value upon them.

In the same Manner I have seen in almost all the Counties in ENGLAND, for I have visited most of them to encrease these Observations, one where or other in the Fields these old Delves, Pits or Hollows, they are now overgrown with Grass; but in those Counties where Marle is commonly used, they are always known to be old Marle Pits; and in others they have generally some Report of their having been dug for something to manure the Land.

This Practice, which has been so universal, I would fain have universal again: for no Manure whatsoever is so advantageous. Let the Farmer mind well the Nature of his Marle, and the Nature of his Soil, to see they are suited to one another; and if his first Trial do not succeed, let him not be dishearten'd at that, but go on: he will not fail of Success at last.

They use Marles in many Parts of BUCKINGHAMSHIRE as frequently as Dung in others; and yet in some Parts of the same County the Farmers seem not to know there is any such Substance in being. I was the Occasion of a Farmer's



mer's trying a red Marle, found there very near the Surface of the Earth in digging a Ditch for a Fence. It was one of the pure Kinds, and as soft as Fullers Earth in the Hands: and it crumbled in the same Manner in Water, and crackled on being put in the Fire. I shewed him by these and other Marks, that it was a right Marle; but whether he laid it on a wrong Soil, or in whatever unskilful Manner he manag'd it, when I next saw him, he reproach'd me for advising him to use it, and declar'd he would never try any Projects again. So difficult is it often to get these People to make any Attempt; so next to impossible to make them persevere.

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### C H A P. III.

#### *Of the several Kinds of impure or mixed Marles.*

THOSE already named are the richest and finest of the Marles: and as all Mixture debases their Value, among the other Kinds which I shall distinguish by the Name of impure or mix'd Marles, the most impure are constantly of the least Value. These mix'd Marles differ not only in Colour, but in their very Nature, according to the Substances which have got in among them. Their Colour is no general Mark of Distinction, but they may be very well arranged under separate Heads, according to the Substances of which they partake. These being Sand, Clay, Loam or Stone, they may be consider'd as

Sandy Marles,      Loamy Marles, and  
Clayey Marles,      Stony Marles:

And among these last are also to be comprehended some which have at first the Hardness of a Stone from their own Nature and Composition, tho' they have not a Particle or real Stone in them.

Many Marles also, beside these natural Earths and stony Matter, contain great Quantities of Sea Shells, which are preserved in them in a singular Manner; for instead of being petrify'd, or render'd hard, they are made brittle, and seem as if they had been calcin'd. These Shells are far from injuring the Marle in its improving Quality; they, on the contrary, are found to encrease that Virtue.

There are of these several Kinds of Marles of all the beforemention'd Colours, but greyish or yellowish are the most frequent. The sandy Kinds are the richest of these impure ones; and they are fittest for ready Use, for they break to Pieces in the Hands easier than any others; and the soonest of any crumble with the Weather. In a proper Application these may be accounted of equal Value with any, for on clayey Lands the very Sand which is contain'd in them is useful.

The loamy Marles are the next in Value among these to the sandy, for they break easily with the Weather; but in these as the former, a great deal of the Advantage arising from the Use of them will depend upon a proper Knowledge of their Nature, and their Use on a right Soil.

The clayey and stoney are inferior to the others: but on some Lands the former are preferable to those which are more pure: and amongst the stoney Kinds there are some, and they even of the hardest, which when properly mellow'd by the Weather, are inferior to none in Richness. I have seen some of these that a large Hammer would make no Impression upon when first dug up, but that with Frost, Rain and Sun-shine, have in six Months Time crumbled away to Powder.

Some of these I have seen which when broke with great Labour, and laid upon the Lands, have for several Months appear'd like so many Stones scatter'd over the Fields, and seem'd to damage rather than improve them: but after one Winter there has not been a Piece of any one of the Lumps so big as a Nutmeg to be found; and the Land has been kept in Heart eight or ten Years by that single Dressing.

One Farmer I knew in WARWICKSHIRE, (where they know the Nature and Use of Marles better than in any County in ENGLAND, after KENT and SUSSEX) who having a stoney Marle upon his Ground, dug it at a good Expence, while all his Neighbours laugh'd at him; and after it had been expos'd to the Air and Rain in his Yard till it began to crack and break, laid it on his Corn Lands, and had it broke there with Hammers: after this it soon melted and enriched the Land to a Degree beyond Belief.

I name this Practice that the Farmer who has a Marle ever so hard and stoney, need not for that Reason give it up as useless.

They have in many Parts of NORTHAMPTONSHIRE a stoney Loam which the common People call Penny Earth, it is full of Sea Shells, some of which are flat, and resemble Pieces of Money, whence it has its Name. This is as hard as Rock when first dug, but it moulders of itself with the Weather, and even the Shells that are in it dissolve, so that not one of them is to be found on the Lands where it was laid. They use it in some Places, but not nearly so much as it deserves; when it is kept dry, it retains its Hardness for ever.

Marle in some Places is to be dug for at a considerable Depth, and even this is well worth while: but more frequently it lies near the Surface; sometimes so near, that they plow up a part of it with the Soil; and the same Thing turns and manures it, and that very profitably.

In KENT, the Marle sometimes lies deep; but in SUSSEX it most frequently is within a Foot or two of the Surface, with a rough Clay over it; this answers a very convenient Purpose, for it holds the Marle so well together above, that by undermining it they can have a fall of a hundred Loads or more at a Time, so that the Expence is hardly any Thing.

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### C H A P. IV.

#### *Of certain Marles found in particular Counties.*

IN BUCKINGHAMSHIRE I have observ'd a very rich Marle of the purer Kind, and of a mixt Nature between the blue and red; the red making



king the Body of the Mass, and the blue being disposed in Streaks and Veins. This is one of the fattest Kinds, as the Farmer terms it; and is the same that is so much esteem'd in KENT for sandy Land.

In WARWICKSHIRE they have a blue and red Marle of a stiffer Kind, which does not do well on Pasture Lands, but excellently on sandy Corn Grounds.

In CHESHIRE they have a Marle of the stony Kind, which they call Slate Marle: they give it this Name because it splits in the Manner of Slates into flat thin Pieces; they have this of all the common Colours, and it is much the same whether red, yellow, whitish, or blue.

They have also in STAFFORDSHIRE on the Borders of CHESHIRE, a Kind of stony Marle which always breaks in a Kind of square Pieces; this they call for that Reason Dice Marle. It is usually yellowish, rarely redish or blueish. Both these Kinds, tho' stony at first, mellow, soften, and fall to Pieces with the Sun and Rains; and they are greatly esteem'd by the Farmers. They have in the same Places clayey Marles, but they find those clog the Land after their enriching Effect is over; whereas these leave it better than it was before they were employ'd, even after their enriching Virtue is gone.

Indeed in most Countries they value the stony Marles, because of their lasting Efficacy. The fatty and crumbly Kinds enrich the Ground more quickly; but it is these hard ones that give that Fruitfulness which lasts many Years; after it has served the Purposes of the Tenant enriching the Landlord.

One Thing farther I must assert from Experience, which is, That some of these Marles of the harder Kinds, which enrich Land for so long a Continuance, have often a bad Effect in the End. After this long Period of Fruitfulness obtain'd from them is over, the Land becomes so barren that scarce any Thing can make it fruitful again.

The hard white Marle is most subject to this Censure, for it approaches to the Nature of Chalk, and the same Thing has been observed of Chalk to a Proverb. But I don't know that the other hard Marles are liable to this Fault.

To the several particular Kind of Marle mention'd for their Use in particular Places, I shall add three or four with the Names by which they are known, upon the Spots where they are found and used; and then close this Chapter: in which having, I hope, thoroughly acquainted the Husbandman what Marle is, and how numerous Kinds there are of it, I shall in the next proceed to the most advantageous Methods of using it.

In SHROPSHIRE, and that part of CHESHIRE which borders on it, they have dusky brownish blue Marle, streaked and spotted with a cleaner blue and with white: this they call Cowshut Marle, and the Country has received great Advantages from the Time in which it has been introduced into frequent Use. This is to be refer'd to the blue Marles of the purer Kinds.

In STAFFORDSHIRE there is a peculiar Kind of stony Marle, which they call Shale Marle there as well as in CHESHIRE, where it is also found

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in Abundance. This is of a greyish or ash Colour, and seems a mere Sand Stone: but it breaks freely enough. They do not use this so generally as they might, but where they do, it turns to a very good Account. If the Farmer therefore finds a blueish grey Sand Stone in his Grounds, let him try whether it does not moulder in the Air, or crackle in the Fire, and if so, let him see to make a better Use of it than they do in many Places in this County; where they absolutely throw it away.

In CHESHIRE they dig a Marle of a dusky Colour, and tough Substance, very unlike the Generality of the other Kinds; this they call Peat Marle. It is one of those which are debas'd by an Admixture of Clay: it is not peculiar to CHESHIRE, for they have it in SHROPSHIRE also; but the Use differs. In CHESHIRE they use it as a Manure; and if laid on proper Land, as the sharp sandy Soils, it yields a good Encrease: in SHROPSHIRE they make Bricks of it.

They have in CHESHIRE also, and in STAFFORDSHIRE, and some other of the neighbouring Counties, a stiffer Kind than the last described. It is of a yellowish Colour, and from that and its Toughness they call it Clay Marle. This often lies in very deep Beds, but the Farmers are not so well acquainted with it as they might be; it is full of Sand and Pebbles in the upper Part of the Bed, where it often rises within a Foot of the Surface, but it is pure below. This is one of the clayey Kinds, and they use it on the worst Lands with very good Success. Let the young Husbandman therefore, who thinks his Land is clayey at the Bottom, in some particular Spots only, examine this Clay. They say all is not Gold that shines. 'Tis true Things are often worse than they seem; but sometimes they are better.

They have also in that County a Kind of Marle they call Paper Marle: this lies in Leaves, and is a very pure and rich Kind.

CHESHIRE is also remarked for another Kind of Marle, by some suppos'd to be particular to that County, they call it Steel Marle: but those who will be at the Pains of examining the several Parts of the Kingdom with the strict Eye that I have, will find very few Things are peculiar to the Places where they are first found, though thought to be produced in no other.

This Steel Marle is of a dusky Colour, often spotted with red, and sometimes with blue. It is very hard; and when struck with a Hammer, naturally shatters into a Kind of square Bits. It is one of the stony Kinds, and is the same in its Nature and Substance with that which they call Dice Marle in NORTHAMPTONSHIRE, though it differs a little in Colour.

I have observ'd with Pleasure, the Manner in which this Kind of Marle divides when laid upon the Ground. First, the large Lumps lie like so much Lumber of which the Land should be cleared: after this one sees all the Surface of the Field spread over with corner'd Pieces of some considerable Bigness: then after a little more Effect of the Weather, it lies every where in Bits like Dice, many of them very small; and after this it is blended with the Mould,

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Mould, and altogether lost. Then it is that its full Virtue and Efficacy are seen in the Crop.

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#### C H A P. V.

##### *Of seeking for Marle.*

**A**S the considerate Husbandman must see by what has been said occasionally already, and will see more fully by the succeeding Chapters, the vast Value of Marle: It is natural that he should bethink himself of seeking for it on his own Grounds, I shall not only encourage, but assist him in the Search.

In the first Place he has this to tempt him to examine his Land in Hope of it, that I have observed already it is frequent in many Places where it is not regarded or even known: and I shall add, that although so little observed, it is a Commodity so naturally and generally the Produce of ENGLAND, that I believe there are few Pieces of Land of any Extent in which one Kind or other of it may not be found.

If it be too deep indeed, it may not be worth taking up, but that is seldom the Case: it is commonly near the Surface.

The several Kinds and Varieties of it have been so fully described, that the Farmer has all the Reason in the World to suppose he shall know it at Sight: I shall add to these the Soils under which it usually lies.

But prior to this, which beginning without any certain Information, is a more random Kind of Search, I would have him examine well both by Report and by the Appearance of the Ground, whether Marle has ever heretofore been dug in his Land, or any where near its Borders.

If he hear that it has, let him look narrowly after those broad and shallow Delves in the Ground which have been before mention'd, for they are certainly the Places where the Pits were. If he can learn no such Thing by Report, yet let him see if there be any such Hollows in the Ground, for tho' less certain, still they are an Evidence that something has been dug: It may have been Gravel, but Marle is more likely.

When he has found any such Hollows, let him mind the Course wherein they run, for that Way probably the Vein of Marle runs also.

If he find only one such, let him first observe how deep it is; for on this depends the Nature of his Search, since by this he may guess whether the Marle lay low or near the Surface.

His Business is to try all about the Place where the Hollow is, for Marle. If that Hollow be very shallow, let him have Holes dug to the Depth of three Foot with a Spade; if deeper, let him use an Augur, such as they bore the Ground with on various Occasions. Let him bore in a great many Places to the Depth of six Foot; for if the Marle lie deeper than that, 'tis hardly worth his digging; but let him examine strictly every Thing the Augur brings up within this Depth. Let him keep in his Mind the va-

rious Kinds of Marles I have describ'd; and if any Thing come up that has the least Appearance or Resemblance of any of those several Kinds, let him try it by seeing if it moulders away in a Basin of Water, if it crackles on being put into the Fire; and what Effect the Sun and Air take upon it when it has lain two or three Nights expos'd.

By these Means if there ever have been Marle dug there; and the Vein of it continues, he will be sure to find where it runs; and he is then to follow the Course of it by the Augur, and consider where he can open a Pit of it the most conveniently for the general Use of his Land.

But suppose there be not the least Sign upon the Ground, or the least Account from Report that Marle ever was dug any where thereabouts. Yet this should not discourage him from enquiring if there be any; for there is a Time for the Discovery of every Thing.

In this Case he must first have Recourse to what he can see upon digging any where. If a Well be sunk at any Time upon or near his Land, let him look carefully over all the Kinds of Earth that are thrown up. Nay, if a Pond be dug, let him make the same Observations.

Let him examine the Sides of Ditches new dug or cleaned; and follow the Plow with a careful Eye, observing if it any where turn up Matter different from the Soil. For Marle often is within the Reach of the Plow.

If he discover nothing of the Nature of Marle in all these Researches, let him have Recourse to the Augur, boring in different Places, but chiefly in the clayey Soils, for under these the Marle ofteneft lies.

The mellow Earth is the next Soil that is likely to conceal Marle: and after this the loamy Earth. It sometimes lies under Gravel, but seldom in any great Plenty: it very rarely is found under a sandy Soil, and then commonly in a thin Vein, and at a great Depth.

The clayey Soil not only ofteneft has Marle under it; but that which lies under this Soil is usually of the finest Kind. I have observ'd before, that the KENTISH Marles generally are cover'd with a Foot or two of tough Clay. In general it is the finest, purest, and richest Marles the Farmer is to expect under this Soil.

It has been observ'd, the fine black mellow Earth of the low Lands, commonly has under it a Bed of tough Clay. Sometimes it has a thick Bed of some fine Marle, particularly of the redish Kind, in the Place of the Clay; and very often a Vein of Marle comes between the Clay and the Mould.

The former is the best for the Farmer; but if the latter presents itself, let him follow with his Augur the Course of the Vein, and he will find it gradually thicken till at last it usually takes the Place of the Clay. It is here he is to open his Marle Pit; and he will often fall upon a Bed of Marle five, six, or seven Foot thick, rising within a Foot and half of the Surface of the Ground.

Sometimes the stony Marles are found under Clay or black Mould, but it is more commonly the pure, fatty, and tender Sort: as to those found under sandy Soils, they are usually one

or



or other of the clayey Marles, and with double Expence in digging, are not of half the Value.

There are some Parts of SUSSEX where a Bed of Marle comes up within eight Inches of the Surface, and when open'd is found to be ten or twelve Foot thick, all of some one of the pure and fine Kinds: and in CHESHIRE, and also in LANCASHIRE, where the best Marles often lie under the fine black Mould, I have seen a Bed of blue Marle that was within a Yard of the Turf, cut down to four Yards deep, and they were not then got through the Vein.

When the Farmer has by the Methods already describ'd, found out a Vein of Marle, and fix'd upon a convenient Part of his Land for opening of a Pit: let him begin by marking out a tolerable large Place for the Work; and for a proper Way for the Carts that are to fetch out the Marle. A great deal depends upon all this being well order'd, and now is his Time for Contrivance.

He is then to employ his Labourers to clear away with Pick-axe, Spade, and Wheel-barrow, all the Soil that covers the Vein of Marle, and when this is done, they are to begin digging it.

The different Condition of the Marle will now be found, and the necessary Accidents of treating it. Where it is of the finest and tenderest Kinds, they often work with a Kind of Hoe, and three Hoers will tear up as much as four can fill it into the Carts.

In the clayey Kinds they use Spades for digging, and then the Diggers must be more than the Fillers. Sometimes these are so dry and tough, that the Workmen must have Water brought to them to wet their Spades; and in other Places they are so wet, that there must be a Pump set up to keep them dry.

When the Marle is got into the Cart, it is to be shot on the Fields; but this in a different Manner according to its Nature. If it be of the fine soft tender Kinds; the best Way is to spread it as it is taken out of the Cart: but if it be of the stony or other compact Kinds, every Load had better be shot separately, and left in a Heap for the whole Winter, that the Frost and Air may mellow and break it.

## CHAP. VI.

### *Of suiting the Marle to the Land.*

**T**HERE are very few Lands that may not be improv'd by Marle, but some require it more than others: there are also many Kinds of Marles, as well as many different Sorts of Soils; and the Marles of one Kind are fit for certain Lands, and those of other Kinds for others. A strict regard must be had to this, otherwise, as already observed, the Land may be spoiled.

In some Places they have a Way of laying on such a Quantity of the Marle, that they may be said to add a Soil rather than to improve what was there before. This is the Practice in some Parts of CHESHIRE, where they will lay fifteen, sixteen, or eighteen Hundred Load of Marle upon one of their Acres; they will

thus in Digging and Carriage bestow twelve or fifteen Pounds upon marling an Acre; and then they will work it with good Management twenty or thirty Years together.

For the first Years they plow very shallow; they don't cut up more than an Inch of the Soil for fear of burying the Marle; so going deeper in the following Years. This is a particular Practice.

In the first Place, the Soil which requires Marle most of all, and which is the most improv'd by it, is the sandy. The Advantage arising from this Practice upon such Lands, is beyond the Belief of any who have not seen the Fact.

The Marle which is fit for this Land is the clayey Kind, and more than all others, that brownish or yellowish Marle, which looks like real Clay in the Pit, but is found of so different a Nature when examin'd. This Marle, or any one of the clayey Kind, laid thick upon a sandy Soil, gives it at once a Body and a Richness. The Clay that is in it binding the light Soil tolerably together, at the same Time that the fatty and enriching Earth blends itself with the whole.

This is the Application of Marle, in which its Virtue is most fully seen: for by this Means Land, that before wou'd yield scarce any thing, has been known to produce surprizing Crops; nay, it has been try'd by way of Experiment, to marle one half of a Piece of new broke-up Ground of this sandy Kind, and leave the other in its natural Condition; then both being sown with the same Seed, the marled Part has yielded a plentiful Crop, when the other has not ripen'd one Ear.

Another great Advantage of this Practice is, that in Years wherein other Crops fail, those succeed which are on these Grounds even to Admiration. Thus when there comes a dropping Summer, while a Piece of marled sandy Soil is in its full Vigour, the Increase is prodigious. These Seasons generally hurt the Crop on other Lands; but they load these with as much as can stand upon the Ground.

But all this Time Care must be taken that the Marle be well suited to the Soil; and this is to be done by this Rule; the more sandy the Ground is, the more clayey the Marle must be.

If a rash young Husbandman hearing of the great Profit that arises from laying Marle on sandy Soils, should without any farther Thought lay on one of the pure fat and tender Marles before described upon a very barren sandy Piece of Ground, tho' he put on a CHESHIRE Load, yet the Wet would wash it in, and the Sand would swallow it up in such a Manner, that the whole Effect wou'd be lost after all the Labour and Expence.

Next after the sandy, the Soil which receives most Advantage from Marle is the Loamy; and this admits the greatest Improvement of all when the Sand in its Composition bears an over Proportion to the Clay. I have seen Lands, the Soil of which was fitter to make Bricks than to yield Corn, so improved by Marle, that the Corn did stand like a Sward of Grass at its first Appearance, and has throve so afterwards, that every Stalk has come to a due Maturity.

The



The Marle for this Kind of Land must be the purest and finest than can be had. If the Farmer should lay on a clayey, or a sandy Marle, he would only encrease the Proportion of one or other Ingredient of the natural Land which already made it barren.

All that renders a loamy Earth at all fruitful in its natural State, is the Quantity of Mould that is mix'd in it; now a fine Marle is of the Nature of that Mould, only much richer: it blends among the Loam, and the Firmness of the loamy Soil holds it till it have yielded all its Virtue.

I have found from Experience, that of all the Kinds of Marle, that which agrees best with a loamy Soil, is the blue, pure and tender Marle. After this the best is the yellow: but any Marle that is light and free from Mixture will answer the Purpose.

I have seen the stony Marles try'd in some Counties upon their loamy Soils with tolerable good Success. Particularly in STAFFORDSHIRE, I have seen that Sort they call shale Marle, which has been describ'd in its Place, laid on a tough loamy Soil, abounding naturally too much with Clay.

This has succeeded but poorly at first. The first Year scarce at all, the second somewhat better, and the third and fourth best of all. But as I have had Opportunities of making the Computation fairly in both Kinds, I find the pure Marle is very much preferable for this Soil to the stony. The Farmer may do well to use any of the stony Kinds when he cannot get the other Sort in the Neighbourhood, and he will reap considerable Advantage from it; but when he can have his Choice, the pure Marle is preferable for this Land by many Degrees.

I have also seen some of these stony Marles, not of the hardest Kind, us'd on sandy Soils, but without any great Success. I once indeed saw a stony Marle that had lain a Season expos'd to the Air spread upon a Field, the Soil of which though sandy, had some natural Richness, and it succeeded tolerably; but such particular Practices are not to be establish'd into Rules.

The Practice of marling Lands is founded upon Reason; and that, as well as Experience, will shew in what Manner it should be done. The pure Marles are all fatty; the mix'd Kinds are either clayey, sandy, loamy, or stony; now upon considering this the Application is easy.

Let us suppose a considerate Farmer to have Pits of all these Kinds of Marle upon his own Ground; and to have a sandy Soil as first mention'd to improve: he will naturally ask himself which of all these shall I use? If I lay on pure Marle, the Rain will wash it to Pieces, and the Sand will suck it up and remain as barren as ever. I may lay that pure Marle upon Soils in which there is something to hold it, but never upon Sand: well then, all the pure Kinds are unfit. Now the Choice is among the others: Shall I lay on a sandy Marle? No: for the Sand will mix with the Sand, and the Marle will be wash'd away as before. I shall only add Sand to Sand with all my Labour? Shall I lay on stony Marle? No: Stone and Sand are but a poor Mixture, and when it breaks, it will

wash away as the other. Shall I use a loamy Marle? why, the Clay that is in Loam will do some good, because it will hold the Fatness; but then the Sand in it is again adding Sand to Sand: well then, there remains the clayey Marle, and this is fittest of all, because the Clay will bind the Sand, while the fat marly Part enriches it: I shall alter my Sand into a Loam; at the same Time that I enrich it by the Marle.

Thus Reason would advise in the Choice of Marles, and Experience shews, that it is exactly the Practice which is the most profitable.

After sandy and loamy Soils, that which receives most Advantage from Marle is mellow Earth: this wants Improvement less than any other Kind, but the proper Use of Marle adds to its Fertility; and there is this farther Advantage, that scarce any Kind of Marle whatsoever but may be us'd to it: but still there are some from which it has more Benefit than others.

Plowed Land, Meadow, and Pasture, when they have this mellow Earth for their Soil, equally receive good from Marle. As to the Grass Lands, only the pure Marles should be used to them, because they wash in readily, and don't lie about in Clots or Lumps upon the Ground. For plow'd Lands of this Soil, any of all the Kinds of Marle may be used with Benefit. If they be of the clayey Sort, they break in with plowing after a little Time; if loamy, they blend so much the sooner; if they be of the stony Kind, it takes Time for the Weather to divide them, but they do very well at last; and finally, if they be of the pure or of the sandy Kind, they break with the first Dressing, and wash in with the Rains immediately.

All the Farmer has to regard in this Case is, whether his mellow Soil approach in any Degree to the Nature of any of the others, for there are in Nature a Variety of Degrees; and then he is to suit his Marle according to the particular Directions given in this Chapter, to the Nature of the Soil whereof it most partakes.

As to chalkey Soils, Marle is not the Manure most suited to them of all others, because Marle is itself in some Degree of a chalkey Nature: nevertheless it is to be used with Prudence to good Purpose.

I have known Farmers who never would permit a Scrap of Marle to be laid on their chalkey Grounds, though they used it to the others, and saw the Benefit. They called this laying Chalk upon Chalk, and laughed those to scorn who advised them to use it: but I shall mention what I have seen against all the Arguments in the World.

Indeed the brittle white Marle of some Counties is in its own Nature so like Chalk, that I would by no Means advise using it on chalkey Lands, tho' on others it may serve as a Manure in the Manner of Chalk, which is known to be an excellent one itself. The Difference between Chalk used as a Manure, and this chalkey Marle, for it may well be called so, is, that the Effect of the Marle is more speedy than that of the Chalk; and that it does not wear out the Land so very much as Chalk does, which in the End leaves it more barren than at first.

Now,



Now, though for the Reasons already given, I do not think it adviseable to lay the white Marle on a chalkey Soil, yet I have seen the rich and pure red Marle, and in some other Places the blue Kind, used with great Profit. Nor is this at all contrary to Reason, for Chalk is one of the driest of Soils, and these pure Kinds of Marle are the fattest of all Manures. What then can be more proper than they to correct the Dryness of the Chalk.

I would therefore advise the Farmer who has a chalkey Soil, not to be afraid of marling it; only as in other Cases let him suit the Marle to it. The blue and red pure Marles are best: after these the pure yellow Marle, or the black if that can be had. And in case of a Defect of all these, he may use the loamy, or the clayey Marles, but these are fitter as they are richer of the Marle.

Gravelly Soils have the same Advantage from Marle as the sandy, and one Reason of this is, that they always have Sand among the Gravel. These let all other Manures be wash'd through them by the first Rains, but the Marles of a proper Kind remain in them. They not only enrich those Lands by their own Mellowness, but they give them a Firmness that will make them hold other Dressings. Dung laid on a loose gravelly Soil is lost and swallow'd up without any Benefit, but Dung upon such a Land that has first been dressed with Marle, takes the same Effect as upon other Soils.

In this, as in all the other Instances, Care must be taken to suit the Marle to the Soil; if a pure Marle were used, it would be washed through quicker than Dung; and if a sandy Marle were chosen, the marley Part of that Mixture would be wash'd down through the Soil, and only the Sand that was among it would remain. This could be no Improvement to a Soil already too sandy.

The proper Marle for a gravelly Soil is the clayey Sort. This is the only Kind that is proper; and this never fails of giving the greatest Advantage.

Last of all I come to speak of the clayey Soils, which are in general supposed to be improper for marling to a Proverb. Every common Farmer can repeat what is retailed from one to another through all the common Writers on Husbandry, and can tell his Son,

He that marles Clay,  
Throws all away.

And this he thinks he has two substantial Reasons for believing to be true, because it is Verse; and because it is in print. But let not the reasonable Husbandman be frighted out of his Profits by Rhymes. I shall inform him that Reason is on the contrary Side, and shall add from what I have seen and known, that Reason is supported by Experience, in this as in all other Things.

It may be possible enough to throw away Cost and Labour by laying an improper Sort of Marle upon a clayey Ground; and the same may be as truly said of any other. But the Business of the present Enquiry is the suiting the Marle to the Land; and when that is observ'd, the same Benefit will follow from the Use of it on these,  
Numb. V.

as on all other Soils. I have said before, that all Soils are capable of Improvement by Marle, and it is because there are Marles of very different Kinds, some of which are suited to every Condition of the Soil. He that should lay a clayey Marle upon a clayey Soil, would have but little Advantage, because it would be in a great Measure adding Clay to Clay: and perhaps the Farmers who first try'd to marle clayey Grounds, had no other than clayey Marles; and thinking all others like them, spoke that in general which was only true in particular.

Excepting the clayey Marles, there is no Kind of them but is good on Clay Grounds. In the first Place, all the pure Marles being well worked in by the Plow, blend with the Soil, and loosen and enrich it. The stony Kinds are kept on or near the Surface till they mellow and break, and the Firmness of the Ground takes in all their Benefit: the loamy Marles, if there be too much Clay in them, are to be rejected as approaching to the Nature of the clayey Kind, but if otherwise, they are excellent, as they approach to the Nature of the sandy ones. These last mention'd are for clayey Soils the best of all, for they consist only of a fine fatty Marle and Sand, and they act doubly upon the Clay, at once loosening and enriching it. As soon as they are laid on, they break and crumble to Pieces, for the sandy Marles are the brittlest of all the Kinds, and thus separated the Sand, gets into the Clay, and makes Way for the Marle, which the Rains wash thoroughly in, and which is then detain'd among it to exert the full Effect of its Fertility.

He therefore that has a clayey Soil to manure, and can get at a sandy Marle, has it in his Power to raise his Land to many Times its original Value. If a due Quantity be laid on, though not such a Load as the CHESHIRE People use, the Sand in the Mixture converts the Clay into a Loam; and it becomes as it were another Soil, enriched with a mellow and fine Manure.

If the Farmer cannot get at a sandy Marle, he may use any of the other Kinds excepting only the clayey, as has been said before.

## CHAP. VII.

### *Of the Manner of using Marle.*

HAVING taught the practical Farmer to know Marle when he sees it, how to seek for it on his own Grounds, and in what Manner to suit the Kind to the Nature of the Land; it remains to instruct him in the Manner of using it. For this is no little Article, and in this the Experience of others only can be his Guide, comparing their Success one with another: for I am sorry to say, not only the Practice of a particular County may many Times mislead him; but what has been written under the Appearance of Advice is too often false.

As to the Quantity that he shall lay upon his Land, I have seen so many Errors on both Sides, that the Truth seems hard to hit. Some of the STAFFORDSHIRE Farmers lay on so little,  
O that



that it scarce answers any Purpose. I have known these contented to use twenty Loads to an Acre, and then they have complained that what was written of the Profit by Marle was not true. In CHESHIRE, on the contrary, they bury their Land under such Loads, as has been said already, that they seem to sow their Marle and not their Ground.

The Medium between these Practices is the right Method; and he who would reap all those Advantages that have been declar'd of Marle, must follow that Course. The right Use of Marle is not to put it in the Place of the Soil, but to make a Mixture of it with the Soil, so as to raise a poor Land into the Condition of one naturally rich: to do this, a due Quantity of the Marle must be employ'd; and to give a general Rule, that should be about a hundred Loads to an Acre.

The best Way of sowing marled Land is under Furrow, this I have seen prov'd by many Experiences.

The Farmer is not to look for the full Effect of this the first Year, but it will last as before observed: and the Continuance will be according to the Nature of the Soil, and the Kind of the Marle, seven, ten, twenty, or even thirty Years.

When the Farmer sees his Land that has been marled after fair Weather look all over white, as if covered with a Hoar Frost, he may conclude it will answer his best Expectations. It is a Proof that the Marle was good in itself, that it has been used in due Quantity, and that it is well mix'd with the Land.

Some have deliver'd this white Appearance as a Mark that there is Marle in any Part of the Land where it is seen; but Marle cannot discover itself in that manner in its natural Beds, unless they lie almost close to the Surface. It is therefore of little Use in that Respect, but on the Lands where it has been laid, when there is this Appearance, 'tis certain that it is mix'd and mellow'd in the Ground.

I have shewn to what particular Lands the different Sorts of Marle are requir'd. If the hard and stony Kinds are used, they must be laid on early in the Season: if the Clayey a little later, the Loamy may be a little later yet than the Clay: the pure Marles of all Kinds, and the sandy Marles, are to be laid on very late. In this the Farmer's Discretion will direct him after these general Rules. The proper timing of the laying on this Dressing regards its Effect for the ensuing Year; but the harder Kinds with the best Management will not do much so soon.

The Method already nam'd of piling the stony Kinds in Heaps, that they may break before they are laid on the Land, is useful. Some sprinkle the Marle, in these Heaps, from Time to Time, to assist this Breaking: and, in some Counties they calcine not only these harder Marles, but any Kind they have into Lime, in Kilns made for that Purpose. They all burn easily, but they make a weak Kind of Lime. I have seen this try'd with great Advantage on some very indifferent Lands: the Quantity to be used of the burnt Marle is about fifty Load to an Acre.

This burning of Marles, tho' it succeed well enough, is altogether altering their Quality. It is fittest for the harder Kinds, but I should prefer the Use of the Natural Marle, from what I have seen, far before it.

The last Method of laying on the Marle is, to shoot the several Loads as they are brought out of the Pit, at about equal Distances one from another; and then to spread them all. This will occasion the Ground to be all cover'd with the same Thickness. When it is thus spread, it must be well mix'd with the Soil, and all laid smooth and level together: and the quicker this is done from the Time that the Marle be taken out of the Bed, provided it be a pure or a sandy Marle, the better; for as these crumble to Pieces almost directly, the Business is to get them mix'd in the Ground at once, that they may begin to break among it, and so perfectly make one Body of the whole; for this is the true Nature of an Improvement by Marle.

A clayey Marle should never be laid on in the Beginning of Winter, for it sometimes, instead of breaking, grows tough with repeated wetting, and the Land that should have been improved, is render'd worse by it.

This is one of those Accidents that have made the Farmers in some Places declare against Marle when they had try'd it. Accidents are possible to all Things, they usually happen thro' Ignorance; but sometimes the Seasons occasion them, the prudent Farmer is to inform himself how they may be cured.

In case of the Marles binding in this Manner, he must strew over it a small Quantity of Marle Lime, or of other Lime mix'd with well rotted Dung; this will immediately break it: and not only that, but the Land will be so much the more enriched by this double Dressing, that the Largeness of the Crop will leave him no Room to complain of his double Expence: it will be doubled in Proportion. This I have seen try'd, and I have been surpriz'd at the Produce. Thus Accidents when rightly manag'd may prove Advantages.

If the Field to be marled lie level, the Marle is to be spread evenly over it, not thicker in one Place than another: but if it lie upon the Descent, the best Way is to spread the Marle half as thick again on the higher Part of the Field as on the lower, for the Rains will wash enough of its best Part down to make all equal. I have seen where a Field has lain greatly on the Descent, and this Management has not been used, the Crop vastly thicker on the lower Part than on the upper; and on examining the Soil, it has appeared quite different in the upper and lower Part; not only a great deal of the Richness of the Marle, but of the finest Part of the Soil itself being wash'd down.

These are Accidents on which the prudent Farmer should always have a watchful Eye; for he may prevent their Inconveniencies by right Management.

Burnt Marle, or as it is rightly enough called Marle Lime, can never be needful where pure Marle has been used, although it may after the tough clayey or other mixed Kinds; for instead of binding, the pure Kinds moulder away



away either while they are wet, or in the drying.

The Nature of the Soil is to be consider'd for the Time of laying on the Marle, as well as the Nature of the Marle itself. If it be a hard binding Ground, the best Time of laying on the Marle is the Beginning of Winter; if a light loose Soil, the Spring or Summer: always accommodating this however to the other Consideration, the Nature of the Marle itself, as that is the most important.

If the Farmer upon thoroughly considering the Nature of his Land, determine after eight or ten Crops upon the Strength of his Marle, to have Grass, he must manage according to the Nature of the Marle that he used.

If it were a stony or a sandy Marle, or if it were any of the purer Kinds, he has nothing to do but expect the Grass when he lays the Land for it, for without any farther Assistance it will come with great Strength and Freshness: but if it were a clayey Marle that he used, so much of its binding Quality will remain after the Richness has been drawn away by these successive Crops, that unless something be done to help it, there will be but a very poor Appearance of Grass. Foreseeing this, he is to use the proper Remedy; that is, he must give it a Dressing of Dung and Lime toward the End of the Time. By this Means it will yield him two or three Crops more, and excellent Grass afterwards.

It is impossible to give one and the same Direction for all Lands, as to the Times of marling, and what may be reasonably expected from them; for the Nature both of the Marle and of the Soil, make an endless Variety; but the Farmer will see by his Crops when the Land needs to be refreshed.

## CHAP. VIII.

### *Of the vast Fertility of marled Lands.*

**T**O encourage the Farmer as much as possible to the Practice of this excellent Part of Husbandry; I shall add something of the Advantages of the Practice, which are so great, that I am sensible he who has not lived in Counties where it is commonly used, will not easily believe the Accounts. However, having Truth for my Guide, I shall speak freely, and refer the Cause to the Determination of experienced Persons.

In the first Place, the Quantity of Corn that will ripen upon a well marled Land, is much greater than that which can have Nourishment on any other, for there is nothing whatsoever so full of real Nourishment for Corn as Marle.

I have seen a Piece of Ground so exceedingly barren, that the common Heath Ground is not worse, try'd with Marle to the greatest Advantage. That Soil which would hardly afford Nourishment to wild Grass or Weeds, being well cover'd with Marle, has yielded a prodigious Crop.

It was in BUCKINGHAMSHIRE I saw this Experiment, the most fairly try'd by a Gentleman who had discover'd a good, fat, but somewhat

clayey Marle upon his Estate: he order'd an Acre of this barren Land, that in the Memory of Man had hardly let for any Thing, to be cover'd with four hundred Load of Marle. The Eyes of all the neighbouring Farmers were upon him, and the first Year they began to laugh at him as a Schemer, for it did not yield much; but the three succeeding Years, though he did no more to it, the Crop was larger than on any of their best Lands.

This is Fact: and is not this a plain Way for a Farmer to make a Fortune. Let him see there is Marle to be had; and then let him take a Piece of such Ground in a proper Manner; he will have it for little, and it will yield more than the finest Lands in the Country.

He who shall attempt to make himself in this Manner, need never be afraid of the Expence of Dressing the Ground. Let him first take Care according to the Rules before laid down, that the Marle he uses be a proper Kind for the Soil, and it will answer at any Price.

The CHESHIRE Farmers who use so monstrous a Quantity of Marle, and often fetch it a great Way into the Bargain, never find themselves Losers, except by the Folly of ill-matching the Soil and Kind. When these suit one another, though they bestow twenty Pound an Acre upon their Land, as they sometimes do, laying on the Quantities before mention'd, they always find it worth while.

The great Advantage of Marle, is its lasting Virtue, for according to that is to be counted the Expence; good Dung is worn out in three Years Crops, and must be renew'd: but the marling lasts thirty in some Places. In this Case, though it cost ten Times as much at first, the Price is the same in the End: and there is no Proportion between the Crops on dunged Land, and marled.

There are Years when most other Lands fail: but it is the Advantage of Marle that it stands all Seasons. Thus when others have poor Crops, he that marles his Land has plenty-full Harvests. This enriches him doubly, because of the advanced Price of Corn in those Years, and at the same Time it is a Benefit to the Country.

In fine, there are many Ways by which the Husbandman may with Care and Industry get himself a Fortune, but none so soon as by this.

To these Observations of my own, I shall add a Letter from a very worthy and experienced Gentleman in SHROPSHIRE; containing some Things, which as they came so well from his Hand, I have not mention'd before.

To \*\*\*\*\*

S I R,

"Whereas I understand you have been making  
"Enquiries about the Nature and Use of Marle  
"in this Part of ENGLAND, designing to print  
"your Observations, I take the Liberty, tho' a  
"Stranger to you, to contribute my Mite to  
"so good a Work: and you may depend all I  
"say is true, for I have try'd it. I must needs  
"say our Farmers know the Use of Marle well  
"enough on their Corn Lands, but they don't  
"use it on Pasture and Meadow Grounds so  
"much



“ much as they might. I have for many Years  
 “ had better Hay, and better Feed for my Cat-  
 “ tle than any of my Neighbours: and though  
 “ I tell them it is because I marle my Grafs  
 “ Grounds, they won’t imitate me. But I as-  
 “ sure you from Experience, it is very profit-  
 “ able. I once damag’d a fine Meadow by lay-  
 “ ing on a clayey Marle, and another Time I  
 “ buried the Grafs by loading it too much;  
 “ but now I have found by frequent Trials,  
 “ what is the right Sort and right Proportion,  
 “ I never fail. I lay a light crumbly Marle  
 “ upon my Grafs Grounds, not minding the  
 “ Colour, and I allow twenty Load to an A-  
 “ cre; this always pays ten-fold. Another  
 “ Thing I must needs tell you, which I have  
 “ learn’d from Experience. When I design to  
 “ break up a Piece of Ground, I marle it well  
 “ two Years before. I allow for this thirty  
 “ Load of good Marle to an Acre; by this  
 “ Means my first Year is as good as some  
 “ People’s second or third after marling. Then  
 “ there is another Thing upon my marled plow’d  
 “ Land; I don’t begin with Wheat as others  
 “ do: I sow for the first Crop Oats, the Land  
 “ is in Heart enough to yield them well, and  
 “ then the three or four next Crops I have  
 “ Wheat or Barley. I always do another Thing  
 “ particular, that is, I harrow in the Marle  
 “ just before I plow it, and thus I mix my  
 “ Marle better with the Soil than they ever can  
 “ do. I have at one Time or other try’d the  
 “ different Grounds in my Possession, with dif-  
 “ ferent Quantities of Marle; some require  
 “ more, some less: but upon a Medium, I  
 “ think between a Hundred and a Hundred  
 “ and fifty Load to an Acre is the due Propor-  
 “ tion. I have one Field that swallow’d above  
 “ two Hundred Load to the Acre, but I am  
 “ sensible now that was because I used a wrong  
 “ Kind. I find by Experience that my flat  
 “ Lands do best for Marle, for it does not  
 “ well lie upon the others, ’tis so easily dissolv’d  
 “ and wash’d away by Rains: I always allow a  
 “ larger Quantity to those Fields, but they do  
 “ not succeed so well. If these Remarks can be  
 “ of any Use, I shall be very glad to have given  
 “ any Help to your publick spirited Design;  
 “ who am,

Worthy SIR,

Your humble Servant to command,

WILLIAM HUNSDON.

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## CHAP. IX.

### *Of the Use of Mud as a Manure.*

**H**AVING begun this Treatise on Manures with Marle, I shall proceed to examine such others as are of an earthy Nature, before I enter on those of the several other Kinds.

In this Course the natural Choice for the next in order falls on Mud, for although Mud is in its Origin and Nature different altogether from Marle, yet it more than any other Kind resembles it in some of its Effects,

Mud, properly so called, is the finest mellow Earth, wash’d and worn to a surprizing Finess by the Action of Water. This is the Condition of fine and pure Mud: of the other Kinds I shall speak presently. This is such as is drag’d out of the Bottoms of Rivers, where it has been many Years collecting, and where Sand and all other Foulnesses whatsoever are thoroughly wash’d from it.

No one will wonder that I say this, in some of its Properties, resembles Marle. It is the softest, fattest, and mellowest of all earthy Substances after that; and like Marle it breaks with the least Rains, and crumbles away: so far they are alike, as also in giving great Fertility: but Marle is a particular Substance, and has a lasting Quality of enriching Land, whereas Mud is only Mould in a particular Form, and its Effect is of no great Continuance.

The next to the Mud of Rivers is that of Ponds: but this is less pure and fine; it is often clayey, and generally has some Mixture of Sand.

The last Kind to be named is, that Mud which is thrown up in the Cleansing of Ditches. This is the poorest and worst of all: but even the worst Sorts are not to be rejected or despised; for they have their particular Uses which the very finest would not answer so well.

The Mud of Ditches, especially those by Road Sides, is full of Grit and Sand, blown in with the Dust: it is short enough, but wants Mellowness.

The first Thing the Farmer is to do in these Matters, is like what he is to do in respect of his Marle. He must learn to distinguish these three Kinds of Mud by the Names of River Mud, Pond Mud, and Ditch Mud; and then consider from their Nature and from Experience, what Soils each of them will severally suit.

As Marle is most used on plow’d Lands, Mud is most frequently laid on Pasture and Meadow Grounds. But this need not be established as an universal Rule. We have seen how Marle may be used with Advantage on Pasture Grounds; and Mud will also help many Corn Lands.

Marle is commonly used alone, and Mud with other Ingredients; but in some Instances Marle may be mix’d also; and in several Cases Mud may be best used alone.

From the different Nature of the Mud it is qualified to answer different Purposes. River Mud is proper to give Fertility, and nothing else: for its Richness is all its Character. Pond Mud will enrich, and at the same Time give a Body to the Soil from the Clay it usually contains; and Ditch Mud though it will less enrich, will serve better than any to break a tough Land.

When Mud is to be laid on a plow’d Land, this is usually the Kind.

From this Consideration of their Nature, the Farmer will be led to a general Notion of their Use, and the Lands to which they are suited. Thus the River Mud is proper for Meadows and Pastures of a mellow Soil, that want nothing but a Recruit of that fine Mould, which the several Growths have wasted and drawn forth;

Pond



Pond Mud is best where the Soil is too light and crumbly; and Ditch Mud is preferable to both on a clayey Ground.

Mud, especially that out of Rivers, has this particular Quality, that it mixes in a favourable Manner with the finer Part of Dung. This I have observed several Times in my own Meadows. When I have given them a Sprinkling of Mud and Dung mix'd together, after a few Showers going over the Ground, I have found the strawy Part washed clean, and nothing but that remaining; the Mud and the rich Part of the Dung being wholly gone down into the Land: and the next Crop has sufficiently found their Effects.

People who study the Growth of Plants, talk greatly of the Value of virgin Earth, that is, Earth on which nothing ever grew. River Mud is the nearest this virgin Earth in its Nature, of any thing whatever.

I have seen in some Parts of NORTHAMPTONSHIRE, the fine black Mould which they there call the moory Soil, laid upon dry gravelly Grounds with great Success; the Mud of Rivers would answer this Purpose better: this I affirm from Experience; for having advised an Husbandman of that County, who used to take this black Soil out of the Fen Lands for his stony Pastures, to use Mud dragged out of the River Nen, or Nine as they call it, in its Place; he has since acknowledged to me, by Letter, that he found he could dress his Pastures this Way at less than half the Expence, and they produced better.

I advise the Farmer who has dry Pastures, whether they be of a stony, gravelly, or sandy Nature, to use this Manure preferably to all others; but let him observe the following Directions:

If the Land be entirely of a loose Nature, let him use the Pond Mud, mix'd with rich well rotted Dung; and lay it on in a good round Quantity.

If the Soil be mellow, and only require to be recruited and put in Heart, after several Growths that have exhausted it, let him mix pure River Mud with the Dung of Poultry or Sheep, and scatter this lightly over the Ground. A very little of this answers the Purpose; and it is best to use a little at a Time, and repeat it often.

If the Soil be clayey, let him take the Mud of Ditches, and make a Mixture of it with Chalk and rotten Dung: this being spread tolerably thick, will break and mellow the Ground, as well as give it Warmth and Richness.

I know a Farmer in LINCOLNSHIRE, where there are as many fine feeding Grounds, as any in most Places, who always excelled the whole Neighbourhood in this Respect; and it was by means of a Compost of his own inventing, of which he gave me the following Account: I place it here, because Mud, of which we treat in this Chapter, was the material Ingredient.

He made choice of a Piece of low Ground near his Yard, where the Drainings of the Yard naturally came; he there dug an Hole eight Foot deep, the Soil was a mellow Earth, and at this Depth it rested upon Clay; and there was some Sand and Gravel, and a thin Bed of light Clay between. He made his Diggers throw up the

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good Soil on one Side of the Pit, and the Clay, Sand, and Gravel, on the other.

The Pit being thus funk, he threw in, first of all, some Litter, and upon that a Layer of large Hedge Weeds, that were not run to Seed; over these he threw in the Soil that had been laid by itself; then he threw Cow Dung in a good Quantity. When this was done, they drag'd up the Weeds out of the nearest Waters, and laid in a great Bed of them, then they cover'd all three or four Foot deep with rich Pond Mud: upon all this they threw in more Earth, from the parings of Banks, and cleaning of Ditches, and then laid over all, more Litter to stop the Wet, and let it drain there.

This Matter he let lie a considerable Time, all the while rotting together, and receiving the rich Drainings of the Yard. When all was mellowed together he dug it out, and spread it lightly upon his Pasture Grounds; and to this was owing that particular Encrease.

It is in every Farmer's Power to imitate this Practice. I am a Witness that it will excellently answer the Intent in Grass Grounds, and I believe it would do very well upon the mellow Soils in Corn Lands, but this has not been try'd.



## C H A P. X.

### *Of the Use of Clay as a Manure.*

IT may seem strange to the unexperienced, that Clay, which, when it makes the essential Part of a Soil, requires more manuring than almost any other, should itself serve as a Manure; but Practice shews that it answers, in this Case, excellently, when used with Discretion. And indeed, as the Barrenness of most Soils consists in the Abundance of some one Ingredient in the general Mixture; there is scarce any one Kind that may not serve as a Manure for some other.

Nature, when she succeeds very happily, often does it no other Way than by a due Mixture of several unpromising Ingredients; or of such Things as might, of themselves, be called unfruitful. The due Mixture of one with another, is the great Matter.

Thus Sand is of itself barren, nor will a little mellow Earth mix'd with it, render it fruitful: in the same Manner Clay is in itself barren, and tho' some Mould be mixed with it, 'tis still hard, tough, and fruitless; but when Clay is added to the Sand and Mould of the first named Composition, or when Sand is added to the Clay and Mould in the second, either Way there is made a loamy Soil, which is sufficiently fruitful.

We see therefore how it is that Nature gives Fertility to these unpromising Ingredients; and in the same Manner we can give it by Art. The first Business is to know what makes the Soil barren; and the next to supply its Defect. Thus we can add Sand to a clayey Soil; a Clay to one that is sandy: and in this Light it is that Clay, which is barren in itself, yet under proper Directions, serves as a Manure to give Fruitfulness.

Clay is, upon this Principle, used alone in STAFFORDSHIRE, and some other Counties, as a



Manure to sandy, and also to gravelly and stony Lands. For this Purpose Clays are taken just as they came out of the Pit; and the Difficulty of mixing them well with the Soil, which is in this Case the Farmer's greatest Trouble, is very well repaid by the Fertility they give.

The Principle upon which Clay becomes a Manure in these Cases is very plain. A loamy Soil is preferable to a dry Sand, or a scorching naked Gravel; if Nature had mixed some Clay with these gravelly or sandy Soils, they would then have been loamy Soils, and would consequently have been more fruitful. Now what Nature might have done, the Farmer in this Case may do, as before said. In adding Clay he converts the sandy to a loamy Soil.

In this Case the Clay acts in a double Capacity; in the first Place it gives a Firmness to the Soil, enabling it to give a proper Fixture to the Roots of the Corn, and to retain other Manures; and in the second, by its natural Coldness, it tempers the scorching Heat of the others, which in dry Summers burn up the Crop.

Clay from the Pits is better for this Purpose, than such as is taken from the Surface of the Earth; because it is purer, and never having had any Growth upon it, 'tis so far of the Nature of a virgin Earth.

The best Clay for the Use of these absolute sandy and gravelly Soils is the red, the next best the yellow. But when there is a fairer Mixture of Earth with the Sand, then the blue Clays answer best; for there is somewhat of a Fatness in them which tends to the Quality of Marles.

I would, by all Means, advise the Farmer who has a barren, sandy, or gravelly Soil to deal with, to use the red or the yellow Clay as a Manure. He may have these Lands cheap; and once manuring them will last for his Life.

There is something which Clay, used as a Manure, enjoys in common with Marle, that is, the lasting Fertility it gives: in this Respect it even exceeds Marle, for the Effect lasts longer.

I at this Time know some Lands that have been dress'd with Clay near thirty Years ago, and retain the Fertility yet; and I dare say will hold good ten or twelve Years more. There can be no Mistake in this Matter, because in the Instance I name, which is upon the Edge of BUCKINGHAMSHIRE towards MIDDLESEX, it was only one Farmer who used a yellow Clay upon his sandy Field. The Time is well known when this was done; and his Crops at this Day are greatly richer than those upon the other Fields, from which he is parted only by an Hedge; and which had all the same natural Soil.

There cannot be a cheaper or readier Manure than Clay, so that it is strongly recommended that Way; and we see fair Experience shews its Value, and the certain and lasting Profit that attends its Use.

As to Quantity, I am in this as in all other Respects, for using Moderation, I know too little of any Manure cannot do any good; and at the same Time I am for making up the natural Soil to Fruitfulness, not for laying another Soil in the Place of it. I would advise the laying on about Seventy-five Load to an Acre; to be increased or diminished according to the particular

Circumstances: and from what I have seen I may tell the Farmer who shall practise this Method, not to be disheartened, if it seem at first to want Success.

There requires a thorough mixing of the Clay with the natural Soil, to bring it to any considerable Encrease of Fertility; and with all the Pains the most industrious Man can take, this is not to be done at once. A tough Clay, though laid on ever so carefully, will remain in Cakes and Lumps, in some Degree, for at least a couple of Years.

Upon this depends the Circumstance of the Improvement not being seen at first. As the marled Lands do not come to their full Richness till the second Year, these clay'd Fields are not at the best till the third or fourth. But by this Time, with good plowing and harrowing, the Clay gets well mix'd in; and then it is another Soil, and produces accordingly.

I have known the first Year's Produce of a clay'd Land, rather less than it used to be when left to itself. But from this Time it has grown better and better, till the fifth, sixth, or seventh Year; and from that Time has held its Degree of Fruitfulness, as if it would continue without End.

The Farmer is not to expect such Crops upon one of these Lands, as upon a good Soil well marled, where the Rent is many Times higher, and the Manure costs many Times as much; but computing all Things, the Improvement is at least equal.

Thus far I have consider'd Clay in its native State for a Manure; but I must not quit the Subject before I have taken a proper Notice of it, as it is altered by Art, for the Service of the Farmer.

Though Clay, in the Lump or Cake, has been found to be very barren in all Parts of the World; yet it has been seen in many Places, from different Accidents, that Clay, when reduced to Powder, makes very good Mould.

Upon this has been established the Practice now used in many Places, and getting very deservedly into Use in more, of calcining Clay, or burning it, for the Uses of Husbandry: the Advantages of which are very great.

It appears plainly, from the Fertility of powder'd Clay, that it is not the Substance of that Earth which is an Enemy to the Growth of Plants, but only its compact Texture. Now nothing is able to break that compact Texture of Clay like Fire; and therefore burning has been discover'd for this excellent Purpose. There are, at this Time, many Kilns built for that Use, in different Parts of the Kingdom; in some of which many thousand Loads of red, yellow, and blue Clay are burnt yearly: and it were well for the Country, if the Number were twenty Times as great.

The Fire takes away all the Toughness of the Clay, and in this half-burnt Condition it is a most excellent Manure for Corn Lands of the looser and dryer Kind: breaking easily, and mixing thoroughly with the Soil in a very little Time.

There is also a black Clay called Urry, found in Coal-Pits, which is naturally crumbly, and mixes



mixes readily with any Soil, giving it great Fertility; it usually lies just over the Coal.

Let the Husbandman learn by this, not to despise any thing as a Manure from its appearing unlikely to give Fertility to the Ground; for at first Sight nothing could seem more unlikely than Clay: and let him learn not to despise Projects; for this burning of Clay was at first abused under that Name.



## C H A P. XI.

*Of the Use of Loam as a Manure.*

I HAVE shewn in what a profitable Manner Clay is employ'd as a Manure, and in the succeeding Chapter shall shew how Sand is used to the same Purposes; Loam, as has been explained already, is only a Mixture of Clay and Sand: therefore as these are severally useful to such Lands as want one or the other, this Mixture of them is, in some Places, employ'd in the Dressing of Lands that want both. I have placed it next after Clay as nearest of kin to that Earth, and shall add what I have seen on the Subject of its Use as a Manure, for it is only from Experience I shall write of it.

The Use of Loam, or loamy Earth, as a Manure, is more limited than that of the others; but it is in the narrow Bounds allowed to it, not trifling.

Clay enriches a sandy Soil by giving it a Body: Sand improves a clayey Soil, by breaking its Toughness; it is also used with Success on some gravelly Grounds, but there are some of these with which Clay will never mix: for those Loam, or a loamy Earth, is the only Manure.

When a gravelly Soil has a good deal of Sand in it, as is frequent; or when it is full of ragged Flints, or rough Pieces of Stone, it will receive the Clay that shall be laid on it as Manure. But when the Soil consists only of smooth round Pebbles, and a little Mould, the Clay will never mix among it. Of this I saw an Instance lately in KENT, which I shall set down as an Example of the Use of Loam.

THOMAS EDMUNDS had a couple of Fields, the Soil of which was made up of round bluish small Pebbles, and a little hazel Mould. But to look upon the Fields, any one would suppose them to be plain naked Gravel, for the Rain continually washed in the Mould, and only the Stones were to be seen.

He had try'd Dung upon it a Year or two to no Manner of Purpose. The Gravel was too hungry for that Manure. A clayey Marle would have done well on this Soil, if laid thick enough, but there was none near; he had been advised to lay on Clay, which he try'd only on one Field, having no great Opinion of it. The Clay never mix'd with the Soil at all, but lay loose after all his Plowings, and did more Harm than Good.

The Clay he had used was yellow, and the Neighbour who gave him the Advice thought the Colour was the Reason of the Failing. There was a Pit of Brick Earth open hard by, this was a reddish Loam. He took this for red Clay, and advised EDMUNDS to try it on the other Field.

So careless are these People, in their own Concerns, that they don't know one Earth from another.

He laid on the Loam two and twenty Loads to the Acre, and after a couple of Plowings it perfectly well mix'd with the rest. Not only the Pebbles hung very well in it; but the Mould turn'd up by deep Plowing, mingled with the rest entirely and perfectly.

This Field had been worked four Years when I saw it, and it was then in excellent Heart. The very Nature of the Soil was chang'd: one would not have believ'd, by looking on it, that it ever was the same with that of the other Field. He is now at work upon that in the same Manner, and I doubt not but he will find the same Benefit.

I once in HERTFORDSHIRE saw Loam laid on a very dry sandy Soil. I confess this at first startled me: because adding Sand to Sand seem'd ill Husbandry, but he was a sensible Man that did it, and he gave me a very good Reason.

This was a hard sandy Piece of Ground which would never take Clay: he had try'd many Times to dress it with that Manure, but it would never break nor mix. This Loam contain'd a great deal of Clay, with but a moderate Quantity of Sand, and it broke and mix'd freely enough with the Soil. So the Farmer had the Advantage of the Clay which was contain'd in the Loam, and the Addition of Sand to his Land, that was before too sandy, was not great.

It is thus the Husbandman must sometimes compromise Matters, Benefits cannot always be had entire. The Harm he did his Ground by the Sand that was in this Loam, was much less than the Good it receiv'd from the Clay; and therefore, on stating the Account, the Ballance was in his Favour.

I have seen Loam used as a Dressing to a small Field of a chalky Soil. This, though not a common Practice, is very reasonable, and the Benefit was very considerable.

Chalky Soils are hot, dry, and loose; now the very Nature of a clayey Loam is cold, moist, and tough. These Qualities in the Loam being the opposite ones to the Fault of the Chalk, they must needs correct and improve it. Thus that is often founded upon Reason which appears the most strange.

Loam, or a loamy Earth, may also be used with Advantage on these loose mellow Soils, which they have in LINCOLNSHIRE, which are so loose and light, that they will not give Hold enough to the Roots of the Corn. Clay would be an Advantage to these Lands, but as Clay will not readily mix with them, there being nothing there to break it, a Loam, consisting of a large Proportion of Clay to a little Sand, will excellently answer this Purpose: the Sand disposing the Clay to break and mix with the Mould, which otherwise it would not; and the small Quantity of Sand that goes in along with it, being of no bad Consequence.

I have been the larger on this Head, because Loam, or loamy Earths, are always at hand; and their Uses in Husbandry are very imperfectly known. We see almost any thing will answer the Purpose of a Manure on some Soil or other; and it is good to know all that can be used, that when one cannot be had another may.



Loam is one of those Manures that leave Room for the Advantages of any other. Dressings of Dung, and all the rich Kinds, come very well upon the Lands after the Loam, which puts them in a Condition to receive, and to detain their best Parts; and on this depends a great deal of the Success of Husbandry.

A great Art is, not to throw the rich Manures away, which is easily done upon what are called hungry, and loose Soils; Loam gives these a Body, and after that they will retain whatever is given them.

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## CHAP. XII.

### *Of the Use of Sand as a Manure.*

THE practical Husbandman will not be surpriz'd to hear of Sand, which is in itself the most barren of all Things, used as a Manure, because he has doubtless seen it so employ'd with Success: nor will he who is but beginning to learn that Profession, wonder at such an Account here: because he has been prepared for it by what has been said occasionally before.

Every Farmer knows that Sand is good to be laid on Clay Grounds: but we shall in this Place consider its Uses a little farther.

In order to the more perfect understanding of the Advantages arising from a Use of Sand; and to prevent Mistakes which might obstruct the natural Good of using it on proper Lands, the Farmer must recollect what has been said in a former Chapter concerning the three Kinds of Sand.

These are Sea Sand, River Sand, and Pit Sand. Sea and River Sand where they are both sharp and stony, are the same Thing originally, being both no other than Pit Sand wash'd clean; but they differ in this capital Respect, that the one is impregnated with Salt, and the other not. There is another Kind of Sea Sand, as before observ'd, which is made up only of Shells broken to Pieces: and some shelly Matter is frequent in most Sea Sand.

For the Purposes of Husbandry therefore, following this natural Division, we are to distinguish four Kinds of Sand.

1. Pit Sand; consisting of little Stones, with Earth among them.

2. River Sand; consisting of the same Stones only, the earthy Part being wash'd away.

3. Sea Sand, consisting of the same Stones wash'd clean in the same Manner, but with a Saltiness from the Sea Water, and some Pieces of Shells among them; and sometimes farther enriched by decay'd Sea Plants, and Animals.

4. Shelly Sea Sand; consisting altogether of broken Pieces of Shells impregnated with Salt, from the Sea Water.

To these may be added a fifth, but bastard Kind, that is, the Grit of Roads.

These several Kinds the Farmer is careful to distinguish, for they are very different in their Effect and Value; and some of them are able to answer Purposes to which the others are not at all fitted.

Where the Use of Sand is only to break and divide a tough Soil, the cleaner it is the better; because the cleaner the sharper: therefore River Sand is preferable to Sea Sand for this Purpose. The common Sea Sand owes its particular Value above that of Rivers, to the Salt: the Uses of which will be shewn at large in a succeeding Chapter, where Salt will be treated of as a Manure.

If the Farmer have cold clayey Grounds, where nothing is required but to break and warm them, common Sand answers this Purpose.

Pit Sand will do; but any other Kind answers better. The Farmers say Pit Sand has not so much Fertility as River Sand; but the Truth is, the earthy Matter that is among it blunts the sharp Edges of the little Stones, which are to do their Business by breaking and dividing the Clay.

For this Reason clean River Sand is much better on that Occasion, and where that is not to be had, it is better to use the Grit out of Roads, or the sandy Substance which remains in the Roads, when the light Dirt has been wash'd away by the Rains. This is very sharp, and breaks the Earth excellently.

When beside Warmth, the Farmer wants to give Richness to his Land, let him mix well rotted Dung; or fresh Hog's Dung, or Poultry Dung with his Sand. In this Way of using it, Pit Sand does as well as any, and I have seen very great Effects of this mix'd Manure upon a Piece of Land in SHROPSHIRE, where before nothing grew but the poorest of Weeds.

Another Way there is by which the Farmer may make common Pit Sand very useful: this is by laying it in the Way of enriching Ingredients. Thus when he cannot fold Sheep, let him have a Sheep-house to feed them in, and let him lay on a deep Covering of common Sand. This as it receives the Dung and Urine of the Sheep, will become very rich, and may be removed from Time to Time, and fresh put in, till a large Quantity is well impregnated.

Pit Sand does better for this Purpose than any other, because the earthy Matter that is about it detains the Moisture that drains upon it.

When the Husbandman is to improve a cold clayey Land with Sand, let him remember that all he lays on it will be of no Effect without frequent and careful Plowings; by Means of these, the Sand mixes thoroughly with the Clay; and it would otherwise in great Part run in between the Clots, and lie unmixed and useless.

Clay thus mix'd with Sand yields to the Plow, and receives the Rains freely: and it takes any Kind of rich Manure afterwards.

Loamy, gravelly, or chalky Soils, can never be improved by Sand, merely used as Sand; and I suppose no one would think of laying it upon his mellow Earth, unless he wanted to impoverish instead of improve his Land. The only Soil therefore on which it can be used in that naked and simple State, is the clayey. In delivering therefore the Methods of using it on that, I have shewn all the Uses of Pit Sand, River Sand, and the Grit of Roads.



We come now to the Uses of the two Kinds of Sea Sand; the proper Sea Sand, which is like River Sand, but Salt; and the shelly Kind.

These two are not so limited in their Use; for Salt and Shells are both of them very serviceable for the enriching of Land: and the Sea Sands are therefore useful in Proportion as they partake of them. There is also a farther Consideration in respect of some Kinds of Sea Sand; that is, that it contains a great deal of decay'd Animal and Vegetable Matter, from the Bodies of Fish, Weeds, and other Things that die and rot among it. 'Tis only such Sand as lies quiet that can have this Advantage, but it is very great, for nothing is so rich as decay'd Plants and Animals.

The Sea Sand that is taken from a plain Shore, is commonly no Way enrich'd but by the Salt it contains: that which lies in Creeks and among Rocks, where it is less disturb'd, and where more Weeds grow, and more small Animals live, is commonly of the rich Kind last mentioned; and that which is taken up on Beaks and Points of Land, usually consists almost entirely of Shells. The Point of the Island of SHEPEY in KENT, is cover'd to a great Depth with broken Shells in this Manner. At the Surface there lie whole Shells, and large Fragments; but under these is a Quantity of them broke so small, that they pass for Sand, and are called so by the Fishermen, though the Point itself is called SHELLNESS.

For the Farmers more perfect Information, I shall speak of these three Kinds of Sea Sand separately.

First, of that which has its peculiar Virtue from the Salt only, having few or no Shells, or Fragments of Shells among it: this is best when it is softest. The Hardness of common Sand is a valuable Quality in it, because it is used principally to cut and break the Clay: but as this Sea Sand is employ'd to enrich, there needs not in it this Sharpness: and the Sand of the smallest Grain is observ'd always to be the softest.

Of this Kind of Sand the reddest is prefer'd to that of other Colours, by the Farmers upon the SUSSEX Coast and elsewhere. This they have learn'd from Books: but what is there written has been founded only on particular Instances, and should not have been made general. The People of CORNWALL were the first that used Sea Sand as a Manure: and they found the red Kind the best; the Reason of which is, that the red happens to be the finest grain'd Sand on the Coast of CORNWALL; but this is not the Case every where: on the contrary, they have on the SUSSEX Coast a pale yellow Sand, which is much finer and better than the red; but they prefer the red, because they have been told it is best.

This may shew the Benefit of our Method in this Work, of explaining every where the Reason, as well as laying down the Fact. Otherwise what is meant for Instruction often misleads.

The Farmer who has his Choice of Sea Sand, will know for the future that the softest and finest Sand of this Kind, is the best without having any regard to its Colour.

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They say in SUSSEX the largest grain'd Sand gives the most lasting Fruitfulness, though the fine small-grain'd Sort I have named, has the speediest Effect; and the greatest at first. They fancy the other gives this more lasting Benefit, because they can see it longest in the Ground. This may be true when it is a clayey Soil that it is used upon, but that's a particular Case. Otherwise the Salt that is among the Sand is the great Enricher; and it is of no Use that the Sand remains when that is gone.

Some drag up this Sea Sand from under pretty deep Water, where it is always cover'd by the Sea: but that which lies on the Shores, and is wet and dry as the Tide is in or out, is much fatter and better. I write this from Experience. But it should always be taken up wet for the Use of the Husbandman, and carried to his Land as soon as it is a little drain'd; and then the sooner it is plow'd in, the better.

The Sand from deep Water costs most, because of the Trouble of getting it up: it commonly costs twice, sometimes three times as much as the other. The Farmer naturally thinks it better because it is dearer; but I have certain Proof from repeated Trials, that it is worse. I have seen as much Effect from ten Ton of the Shore Sand, as from fifteen of the deep Water Kind.

The Soil which this Sea Sand best suits, is a poor clayey or loamy one: the Quantity to be laid on is from eight to eighteen Tun to the Acre: I have seen five and twenty Tun laid upon an Acre, where it was ready and came cheap; but this is too much. In other Places where the Sand has been a great Way to fetch, I have known a Farmer satisfy himself with two or three Tun to the Acre; but he might as well have done nothing.

From these small Quantities there can come no good: and from the laying on an Overload, it is easy to see what Damage may be done. For first, the Quantity of Sand may be too much, and the Soil may be injur'd in the End, by being made too sandy. Then as to the Saltiness, that may be over-done; especially when the Sand is laid on very wet, as it usually is where they lay on such great Quantities, and that for the same Reason because it is near. And we know by all Experience, that although Salt in a due Degree enriches Land, yet in too large a Quantity it causes Barrenness.

I would advise the Farmer to manage this valuable Manure, when he has it conveniently, in this Manner. Let him dress his worst Lands with it: for I have seen barren clayey Grounds which produced nothing but Fern, brought to yield very good Crops, by this Use of Sea Sand, with a very little Dunging afterwards.

As to the Quantity, I advise in general nine or ten Tun to an Acre, and as this Manure takes Effect immediately, I would have the first Crop Wheat. In marled Lands it is better to have the first Crop, Oats, because the Land does not come to its Strength the first Year. But after this Manure, the first Crop being Wheat, the Farmer may have three other good Crops of Corn, and after that it is advisable to lay it down for Pasture for about five or six Years; mowing it the



the first Year; and afterwards feeding Cattle on it. For it is observ'd by all the Farmers, when this Manure is used, that the Grass rais'd from it, exceeds all other Kinds in Sweetness.

The Warmth this Manure gives to Land is surprizing. The Snow scarce ever lies upon those Grounds that have been well fanded; and partly the Warmth, partly the Richness of the Manure, makes a Spring even in Winter.

We now come to the Consideration of the Sea Sand, taken from fill Places among Rocks, and in Creeks: this, beside its Salt, has such a vast Richness from the decay'd Plants and Animals, that a little of it goes a great Way; and there is no Land whatsoever that will not be improved by it. Even in sandy Soils the Addition of the Sand, unless it be a very dry one indeed, will do little Harm in Comparison of the good of the Animal and Vegetable Part.

This is used in many Parts of CORNWALL with surprizing Benefit: beside the Advantage of Salt and Sand, it contains the richest of all Manures, and succeeds in a very moderate Quantity: five Tun to an Acre is a very fair Allowance; I have seen Crops from it that were astonishing; it suits very well with Wheat, but best of all with Barley, and it gives a Richness to the Ear. The Stalk of Barley sown on this Ground is remarkably short, but the Ear surprizingly long and thick; 'tis often two thirds of the Length of the Stalk or more. This has been said of the Manure by Sea Sand in general, but in CORNWALL where this Barley is so fine, I have observ'd that it is where the foul Sea Sand, for so they call it, has been used. In other Places it is very fine, but it is this enrich'd Sand that gives it the great Fruitfulness.

The Grass that grows upon those Lands, that have been manur'd with this Creek Sand, is like the Corn, preferable in Richness to any other. This is found by the Graziers, for none feeds Cattle like it: 'tis like the Barley, short but full: it does not run to Stalk, but the Leaves are numerous, and the Head rich. It is always full of white Clover, which is a very nourishing Grass, and there is such Heart in the Land, that the Growth is very speedy, and the Sward always fresh, however it is eaten.

Other Sands may agree with particular Soils; but the Farmer who has this within any moderate Reach, is sure of a Treasure: for let his Land, be of what Soil it will, this agrees with it; and it need not be renewed oftener than once in ten or twelve Years.

In the last Place, I come to consider that Sort of Sea Sand which contains a great Quantity of Sea Shells, or which is altogether made up of Pieces of broken Sea Shells, and is thence called Shell Sand. This has the common Advantage of Sand, even tho' it be that consisting of Shells only, for it will break and divide a tough Soil: but it has the farther Benefit of enriching it in a very considerable Manner.

There are two different Accounts on which Sea Shells enrich a Soil. In the first Place, these Shells are in their Nature something of kin to Marle, especially when they have been well calcin'd; and that is the Condition of those which are thus broken, and expos'd on the Shores. In

the next Place, as they have been a Part of Animal Bodies, they partake of an Animal Nature: and all Things whatever that do so, are rich.

This Sand agrees excellently with barren heathy Land, that has a clayey Soil, and is naturally over-run with Fern and Fuzzes. The common Hazel Mould is also greatly enrich'd by it; and the Fruitfulness which it gives continues a long Time. The Corn which grows on these Lands has always a short Stalk, and a large Ear; and the Grass is short also, but it is always thick, juicy, and sweet.

The Colour of this Sort of Sand may give some Rule for judging of its Quality. The more Shells or shelly Matter it contains, the richer it is; and the less that shelly Matter is calcin'd, the longer the Improvement made by it lasts; though on the other hand, the whiter it looks, the sooner the Effect is seen. This is very natural, because the white Shells are calcin'd already, and give out their Virtues at once. The others are to be calcin'd by the Sun and Air as they lie on the Ground: this is done gradually, and the Improvement advances in the same Manner.

This is seen very evidently in the Effect of the shelly Sand in SUSSEX, and that in CORNWALL. The SUSSEX Kind in general consists of a good deal of yellowish Sand, with a great Quantity of broken Shells in white Pieces among it. These are Cockle Shells for the most Part, broke by the Dashing of the Water, and calcin'd by laying on a flat Shore. The Cornish shelly Sand is blueish or ash-colour'd; for it consists of some white Sand, with a Quantity of broken Muscle and Limpet Shells: these not being expos'd in general on so flat a Shore, are less calcin'd by being left dry to the Sun and Air.

The SUSSEX shelly Sand enriches Land immediately in the Manner of Dung; but it does not well support more than three Crops of Corn; after which they have five or six Years good Grass, and then repeat the Dressing.

On the other hand, the Cornish Kind does not shew its Effects at once, but the four or five succeeding Years it yields excellent Crops of Wheat or Barley; and after that, affords a much stronger Grass, though as sweet as the other.



### C H A P. XIII.

#### *Of the Use of Gravel as a Manure.*

I AM sensible that many Things are mention'd here to be consider'd as Manures, which will surprize the unexperienced Reader; and this of Gravel is one of them. But 'tis from Practice all that is here written on them is deliver'd. Those very Things which of themselves make very bad Soils, serve to improve others. Sand and Clay are two Instances of this, and Gravel, as will be shewn, is a third.

Gravel making of itself a hot Soil, is good to be used to those which are naturally cold: this is a first general Principle. Cold Lands are mostly tough: now the Gravel at the same Time that



that it warms, breaks them; and gives way to Rains, and to the Roots of Plants.

As breaking the Toughness of the Soil is usually one Point to be aim'd at in the Use of Gravel as a Manure; the best Kind for that Service, is that which is full of rough and ragged Flints, and other Stones. This will warm a Soil as much as that Gravel which consists only of round smooth Pebbles; and will break it a great deal more.

As they are usually clayey Grounds that are improved by Gravel, the Farmer must take Care there is no Clay hanging about the Stones, as is the Case naturally in many Pits: and he will do well to have all the large Stones pick'd out, they being only hurtful.

In BUCKINGHAMSHIRE I have seen a Clay Field manur'd with a rough Gravel first, and afterwards with Dung: and the Consequence was a very good Crop. The Dung had been thrown away upon it many a Year before; but the Gravel made way for it, at the same Time that it warm'd the Soil from its own Nature.

But I must inform the Farmer that this was a ragged flinty Gravel, and there were few Stones bigger than a Walnut.

Another Improvement I saw by Gravel in NORTHAMPTONSHIRE, in a different Way, but this was also in a clayey Soil. The Farmer had thrown away a great deal of good Dung upon it, as is often done upon Clays, when at length an Accident relieved him. The Soil was very shallow in his Grounds, and underneath it lay a flinty Gravel with a great Quantity of petrified Oyster-shells among it. He one Year plowed deeper than ordinary, and turn'd up a good deal of his mix'd Gravel with the Soil, and the next Crop was four Times greater than the Land ever produced before in the Memory of the oldest Inhabitants.

It is to be observ'd, that the Gravel in this Place was improved by the petrified Shells, in the same Manner as Sea Sand often is, by the broken Shells that are mix'd among it, as named in the last Chapter. Many other Sea Shells when petrified, become absolute Stone; or there is nothing but a Lump of Stone bearing their Resemblance; but in Oyster-shells it is often otherwise, and in none so much as those of this County: they are turn'd up very frequently, and though in part stony, they have always something of the Shell remaining. They are flakey, and split and moulder to Pieces, after being a little expos'd to the Weather, and act entirely as calcin'd Shells. For I have observ'd, that wherever there are Sea Shells found in the Earth, if they are not petrified, they are always brittle, and as it were calcin'd.

The only Kind of Soil beside the clayey, in which it can ever be proper to use Gravel as a Manure, is that which is the most nearly allied to it, the loamy Soil. I have seen where the Sand in this Soil has been so little in Proportion to the Clay, that the Earth always rose in great Clots from the Plow, and got into Cakes with the Wet. In such a Soil I am certain Gravel would be a good Addition.

I don't speak this from Experience, but only from Conjecture, but it is a Conjecture founded

on Reason. For the Gravel would prevent the Soil from running into great Cakes and Clods; and the Sand would then be able to keep the lesser Lumps a little divided.



#### CHAP. XIV.

##### *Of the Use of Stone as a Manure.*

**E**VEN after treating of Gravel as a Manure, I should be afraid of naming Stone on the same Occasion, were not such use of it supported by Practice, and confirmed as to the Benefit by frequent Experience in OXFORDSHIRE, and some of the adjacent Counties.

The Practice, however singular it may appear, has its Foundation in Reason. In speaking of the Soils in the first Book, I have nam'd some of the stony Kind, which the Farmer likes better than the same Kind of Grounds where there are no Stones among the Earth.

I have also in treating of Gravel, advis'd the Husbandman to prefer such as has rough and irregular shap'd Flints among it, to that which consists entirely of round and smooth Pebbles: and that for a very plain Reason.

Now on these two Observations, the Use of Stone as a Manure, is seen as supported both by Experience and Reason. If of two Fields otherwise the very same in Soil, the one having Stones among it, is more fruitful; and the other not having any, is barren; it is plain that Stones being laid on a barren Ground of that Kind, will improve, and make it fertile.

In the same Manner Reason shews, that if that Kind of Gravel is best for Manure which is fullest of rough Stones, they being more apt to break the Toughness of a Soil; then a Parcel of such rough Stones without any Pebbles at all, must be better than any Gravel whatsoever, for that Purpose.

Again, as the second Use of Gravel is warming the Soil, it is certain that Pieces of Lime Stone, and the like, will answer that Purpose better, than the Pebbles of which Gravel is usually, for the most part, compos'd, because these Stones are in their own Nature warmer than Flints and Pebbles.

Having in this Manner shewn the practical Husbandman the Reason of the Thing, I shall now add what is known from Practice.

In OXFORDSHIRE it is no uncommon Thing, to meet with large Tracts of a cold, tough, and very indifferent Soil. They bestow a great deal of Manure of the common Kinds, upon this in several Places to very little Purpose; but about BANNURV, particularly at HORNTON, they have found a Way of manuring it with the Chippings of Stone to great Profit.

There are Quarries of Stone in that Neighbourhood; and the Pieces that fly off in hewing out the Blocks, are spread upon these plow'd Lands, and work'd in by Degrees, mixing thoroughly with the Soil, and giving it a lasting Fertility.

It is no wonder the Benefit arising from these is lasting, for the Manure must remain a long Time, and though these Pieces of Stone break

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by Degrees with the Weather, they still retain their Power of dividing the tough Soil.

We have a very antient Record of the Use of Stones, in rendering the Earth fertile. Some Foreigners who came to SYRACUSE, and practis'd Husbandry, intended great Improvements in all the neighbouring Lands. The first Step these indefatigable People took was, to pick out all the Stones from the plowed Lands; and this they did so carefully, that after three Plowings there was not a Pebble of the Bigness of a Nut to be found any where. They then went to Sowing, but the Lands produced scarce any thing. The Crops were nothing to what they had been before. And the new Farmers could make nothing of their Undertaking, till they had laid the Stones on again.

After this they continued their other Labours of deep and often plowing, weeding, and the like, in which they were more industrious than any People, and they then succeeded. The Manures they had used when the Stones were off took no Effect; but as soon as they were laid on again, they enriched the Land according to their Nature.

This seemed a Sort of Miracle to the People of that Time. They made Nature a Goddess, and said she would not be put out of her Course. But the Farmer who has read this Work hitherto with Care, and understands the Nature of cold Clays, and the Reason of their Barrenness; as also the Effect of Stones in breaking and dividing such Soils, and giving way to the other Manures to enter into their Body, and for the Corn to shoot out its Stalks, will be able to give an Account of this impoverishing the Land, by removing the Stones, and enriching it again, by laying them again in their Places, without having Recourse to Goddesses and Miracles.

It has pleased God, the Creator of the Earth, to cover it with different Soils, and in some Places to leave them more barren, in others naturally improved. We are to use our Understanding in observing what is the Kind of that natural Improvement; and our Industry in imitating it: for imitating Nature is obeying God.

We see from the old Instance at SYRACUSE, and the modern Observations in NORTHAMPTONSHIRE, that Stones, especially the rough Kind, being in a Corn Land, are a great Advantage to its Fertility. Nor is the Practice of that Part of OXFORDSHIRE I have named, either new or particular. It is not new, for it is mentioned as in common Use by Dr. Plot, who wrote near eighty Years ago; so that, doubtless, it is there a Practice of more than a hundred Years standing; nor is it particular, for I have seen it done in SUSSEX in more than two or three Places. They there lay on the Bits of Stone with the Dung; but the other is the better Practice.

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## CHAPTER XV.

### *Of the Use of Chalk as a Manure.*

I HAVE been speaking of some uncommon Manures, I now come to one which is well known, and frequently used; but which never

can be too much considered; or when rightly understood too much employ'd.

Chalk is one of the most distinguishable Manures in its Effects, which last a great while, but are apt to leave the Land poorer than it was at first, unless some Care be taken to prevent that Mischief.

A great Benefit of Chalk is, that it agrees perfectly well with the two worst Soils we have. A tough Clay, or a bare Sand, are both greatly improved by it. But of this it must be observed, as of other natural and earthy Manures, that it makes way for other Dressings; and prepares the Ground that it improves, for being enriched by every other Means.

Chalk is a general Name, as has been observed before, comprehending many Kinds of this white Substance, of different Degrees of Hardness, and fit for various Purposes; the Farmer is therefore to take Care that he chuses a right Kind.

The common Servants will be able to inform him, that his Chalk must be crumbled to Powder by the Weather, before it is fit to answer his Purpose. He will therefore naturally and justly prefer that Chalk, which is best suited to receive the Effects of the Air; that is the softest.

Chalk burnt into Lime, is used with great Benefit as a Manure; and this Effect of the Air, in breaking and mouldening it to Powder, is a Sort of Calcination, though in a less Degree. It is preferable to the other in the End; for as it is less violent, it leaves more Heart in the Chalk, which is the Occasion why the Effects of Chalk last, by many Years, longer than those of Lime, though the Effect of Lime is more speedy.

The Farmer may be sure that the Chalk which is softest and fattest, is the most free to take the Influence of the Sun, Air, and Rains. This will not only break much sooner, but breaks also more perfectly than the stony Kind; and it is therefore always to be prefer'd, though brought farther and at more Expence.

The hard stony Chalk will scarce break at all. I have known many a Farmer make a great Mistake, by supposing it would mellow and break when in his Land. He has therefore plowed it in, in Lumps, after its being exposed the usual Time to the Air. Such have more than once complain'd, that their Chalk took no Effect; and I have shewn two or three of them the Reason, by taking them to their Ground, and making them see the Lumps of Chalk lying quite unalter'd in the Soil after two or three Years.

There are Chalks so stony that they will hardly break with the Weather at all. These the Husbandman is to reject, unless he intends to burn them to Lime. The Chalk he is to chuse is the soft mellow Kind, which usually lies at a small Depth in the Ground, under a Coat of yellowish marly Clay. I have found Beds of this Chalk in many Counties; and always cover'd in this Manner.

This Kind really approaches to the Nature of Marle, and a Winter's Frost and Rain never fail to reduce it to a Condition of mixing thoroughly with the Soil. Being mix'd in this Manner with the toughest Clays, it brings them into a light and hollow Condition, in which the Rain and Weather penetrate them thoroughly, all rich

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Manures enter perfectly well into their Substance ; Corn can easily shoot through them, and they yield with Freedom to all the Instruments of Husbandry.

What an Advantage is this to the Husbandman, to have a Soil that works easily, takes Dung well, and gives free Growth to his Crop, at the same Time that it has a sufficient Body to hold up the Stalk. This is a Benefit he can only have from his Knowledge and Industry. It is the Soil he makes out of a Clay well chalk'd and well dung'd, for there is no such in Nature.

Indeed there is no Instance wherein the Mixture of Soils so plainly shews its Advantage, as that of Chalk and Clay. Both are naturally barren ; but being mix'd they are capable of producing any thing.

Chalk takes the greatest Effect upon those Lands, which have no Mixture of it in their own Nature ; nor have ever had any of it laid on them before. In these Cases it changes the very Nature of the Soil. One plowing upon a Clay Land that has been chalked, will go as far as three upon one that has not ; and such a Soil, instead of being slow in its Produce after this chalking, pushes too fast, and if not preserved by rich Manures, or recovered by due Rest, after a proper Time, will be perfectly exhausted.

To prevent this Accident, which has cast a Reproach upon chalking of Land, that it enriches the present Possessor, but ruins the next ; I advise the Owner who dresses his proper Land, or the conscientious Farmer, not to lay on his Chalk, as is the Custom, alone, but to mix one Load of mellow Chalk with three Load of Dung, and a Load of River Mud, in order to spread upon his Land. This will keep it in heart, as well as give it that pushing Quality : and it will, after the Power of this is over, receive another Dressing of Chalk with the same Benefit as the first, without any Time of Rest.

The chalking of Lands in this Manner, will answer like the marling of them in some Parts of ENGLAND, where they renew the Dressing once in ten or twelve Years, and keep working the Land from one Generation to another.

The Fault therefore that is charg'd upon Chalk, is rather to be laid at the Door of the Husbandman. There are many Ways of ruining a Piece of Land, and this is one. But the Chalk may be so manag'd, as to enrich it for ever.

I have observed that Chalk does best upon those Lands, which have nothing of it in their own Nature ; and that the Farmer generally succeeds best with it, who brings it farthest. This must not appear an idle Report, for it is founded on Experience. In BUCKINGHAMSHIRE they bring Chalk from Pits, opened for it in particular Places. In many Parts of HERTFORDSHIRE, where the Chalk runs in a thick Bed, at some Depth under the Soil, they dig for it in the Middle of the Field where they intend to use it : Chalk, upon a proper Soil, will do great Service any where. But I have found, by a careful Observation, that although of great Service in both these Counties, it is of much the greatest in the former.

The Quantity of Chalk laid on in these different Places, may also shew that it takes much more Effect in BUCKINGHAMSHIRE, where it does

not lie under the Land on which it is laid, than in HERTFORDSHIRE where it does : for the Farmers are always guided in their Quantity of Manures by Experience. In BUCKINGHAMSHIRE they lay fourteen Load of Chalk upon an Acre ; in HERTFORDSHIRE the common Allowance is twenty-five or thirty Load ; and the Effect in the former County, allowing the Lands to be the same, is considerably greater, as observed already.

This greater Effect from a smaller Quantity of Chalk, I take to be owing to there not laying a Bed of it under the Soil in BUCKINGHAMSHIRE, for I suppose if there did, the Farmers would not go farther to seek it, any more than their Neighbours. The Soil, it has been shewn already, usually partakes of the Nature of the Beds of Matter that lie under it.

In HERTFORDSHIRE the Effect of a good chalking lasts twenty Years, if the Farmer understands his Business, and does not over work it : in BUCKINGHAMSHIRE, where but about half the Quantity is used, it must be allowed, it does not last above fourteen or fifteen Years ; but then the Land, in the former Instance, is ruin'd ; whereas, in the latter, if a little Care has been taken, as directed already, in the first Dressing, it is ready to receive another, with the same Advantage.

The Farmer must dig his Chalk in the Beginning of OCTOBER, and let it be exposed to the Rains and Frost all the Winter ; in Spring it must be beat and spread about, and plowed into the Ground. After this the Corn is to be sown, if Barley, and a fair Allowance of Soot spread over it. This is the common Practice where this Manure is best understood, and the Profit they reap from it is more than can be imagined.

This is the general Rule, but the practical Reader is to suit it to his particular Occasions. If he have a very fine and soft Chalk at hand, he may lay it on immediately from the Pit in Spring. Nay it is the best Method for a Chalk that is so very mellow ; for the Sun and Air, during the Winter, only exhaust such a Chalk as this ; and are not needful for the reducing it to Fineness.

On the contrary, if he can get no other than an hard and stony Kind of Chalk ; let him break it tolerably small, and expose it upon a Lay a Year or two before it is plowed up : this will give it Time to soften, so that it may the better mix with the Soil when plowed in ; and, at the same Time, the Rains will be washing some Virtue out of it, which will be gradually received into the Land whereon it has lain.

The Use of Chalk is, in a Manner, confined to Arable Lands ; but I shall give the Farmer a Piece of Advice, with regard to the laying it on his Pastures ; and in this I shall speak from what I have try'd on my own.

The first Year I used Chalk on my Pasture Grounds, I was afraid I had thrown away my Labour, and perhaps many have been discouraged from the Use of it in the same Manner, by a Trial the Effects whereof they did not sufficiently regard. I perceived that my Grass was not a whit the taller or fuller for it ; and therefore I at first thought it did no good : but I soon found by my Cattle, and in my Dairy, that Chalk gives



gives a Body, or Richness, and Sweetness to the Grass, though it does not encrease the Quantity: my Cattle fatten'd better upon this than I ever knew them upon any Pasture of the same Kind without chalking; and I never saw so rich Milk as I had from the Cows fed upon that Clofe.

I recommend chalking of Pasture Grounds therefore, from my own Practice and Experience, to every Farmer, as much as laying it on his plow'd Lands: but herein I must give him a Word of Advice.

Chalk must be very mellow and crumbly before it is laid on a Pasture, otherwise it does more harm than good. If it be ever to mellow in its own Nature, it must lie a while expos'd to the Weather; and the harder it is, so much the longer it must lie. In a Word, Chalk is never fit to be laid upon Pasture Grounds, till a Man can crumble any Lump of it to Pieces by treading it, or rolling it about a little under his Foot.

In some Parts of ENGLAND the Farmers spread Chalk upon their Lands, after they have marled them: but this is quite unnecessary. It is one of the Practices of the antient Husbandry, and we know how difficult it is to beat the Country People out of the old Tract. It is recommended by MARKHAM, and others of that Time, who always advise the mixing many Dressings; and often direct every Sort of Manure whatsoever, to be laid one over another upon the same Field.

These Writers may often assist the Farmer; and it would be better for the Country in general, if they were more observ'd than they are: but the Practice of ingenious and industrious Persons since their Time has greatly improved the Art of Husbandry.



## CHAP. XVI.

### *Of the Use of Salt as a Manure.*

SALT affords the Farmer one of the strongest Instances of that excellent Rule, that Things may be good in Moderation, though destructive in Excess. We read of Fields sown with Salt in order to make them barren: but we also know by Experience and Observation; from what we see in Nature, and what we are able to effect by Art, that Salt in a due Proportion is a great Cause of the Fertility of Land.

Accident, which is as often the Mother of Improvement, as Necessity is of Invention, first led the Way to the Use of this rich and excellent Manure. But it was Accident attended with Observation: for without that, Heaven and Earth point out Advantages to Mankind in vain.

There had long prevailed an Opinion, that Salt gave Barrenness to Land, and none would ever have disputed the Fact, much less have thought of Salt as a Cause of Fertility, but for the Observation of what follow'd where Salt had chanc'd to be thrown upon Lands in a moderate Quantity.

In DEVONSHIRE a Piece of plow'd Land happen'd to be overflow'd by a Spring Tide, that rose higher than any other had done in the Memory of Man. The Farmer who rented it at a small Price, had lost by it every Year: but the Season succeeding this Overflowing, he found his Crop ten-fold; though he had used no other Methods of dressing or preparing that Field than usual. This was an Accident, the Consequences of which were so plain, every body must see them. If Salt added to Land by Accident made it fruitful, the Farmers were sensible it would have the same Effect if added purposefully with that Intent. On this plain reasoning they began the Practice, and it succeeded happily.

This was the Introduction of Sea Salt as a Manure in DEVONSHIRE, which is the Place, by all I can learn, where it was first used in ENGLAND.

WORCESTERSHIRE appears to be the next Part of this Kingdom where it came into Repute, and that also from the Observation of an Accident, though of another Kind. As in DEVONSHIRE, they were in the Reach of Sea Water; in WORCESTERSHIRE they have Salt Springs. The Water of these is a perfect Brine. It is much stronger of Salt than Sea Water is any where, and the Salt is of the same Kind.

It had been long observ'd in that County, that when this Water dribbled to waste, the Ground was quite barren over which it ran; but that all about those Places, the Grass grew much fuller and finer than elsewhere. Upon this they began to use Salt, or weak Brine in moderate Quantities; first on their Pastures, and afterwards on their plow'd Lands; and the Consequence was, the enriching of them both in a Degree not to be obtain'd by any other Manure, which they could command in that Part of the Kingdom.

After this, People observing the Growths upon those Salt Marshes that lay at a favourable Distance from the Sea, and had the Benefits without the Mischiefs arising from Salt Water, began on comparing them with what was practis'd in the before-mention'd Counties, to understand truly the Nature of Salt as a Manure, and have ever since used it accordingly.

This was the Introduction of that Manure into the Practice of Husbandry, which has now spread very far; and it were to be wish'd would extend itself universally.

We find the old Writers on Husbandry in our own Language, acquainted with the Use of Salt much better than those who condemned it at all Adventures, as a Cause of Barrenness. They understood the Advantage of Sea Sand over River or Pit Sand, and they were sensible that this was owing to the Salt it contain'd.

On this Principle they proceeded when they advis'd those Farmers who lay too far from the Sea, to have the Advantage of Sea Sand, to sprinkle Salt upon their Corn Lands. They prescribe the spreading of this in the Manner of Corn, thinly and evenly over the Ground; they call it sowing of Salt, the Quantity they direct the Farmer to use is two Bushels to an Acre.



One Thing farther I must observe to the Credit of these Authors. They all direct Bay Salt, and it is certain that Bay Salt is more of the genuine Nature of Sea Water than any other. This Kind is made by exposing the Sea Water to the Sun and Winds in shallow Pits dug in the Earth: and the common white Salt is made by boiling Sea Water over the Fire. This last Method evaporates every Thing that was in the Water, except the Salt and stony Matter only; and it is plain enough perceiv'd, because this has no Taste but Saltiness: whereas the Bay Salt which has had no other Heat but that of the Sun, has a sensible Taste, and contains more of the natural Principles of the Sea Water. This is plainly discovered in eating; and not less palpably by its Effect on Land.

The steeping of the Grain that is to be sowed in Brine, is a Practice known all over ENGLAND, and the Advantages of it are well understood. Of this more in its Place hereafter; but it is not amiss to observe here, that this Practice confirms the Account, that Salt in Moderation is useful to Land. It was a Thing discover'd by the same Means, by perfect Accident. The Loading of a Ship that was cast away was Wheat: the Wheat was afterwards sowed, and being sown, it was found to thrive better than any other.

This soon brought into Use the steeping Seed Corn in Brine, and Practice confirms that it not only makes it grow stronger, but prevents Smut.

The Mud out of Salt Water Ditches has been of late brought into Use in ESSEX; they mix it with Lime and mellow Chalk, and it makes an excellent Dressing for the poorest, and most barren Lands.

Upon the whole: The Farmer can never do amiss who uses Salt in the Design of fertilizing his Corn Lands, except he use too much. Moderation is the great Rule of Life: he that can't practise it will thrive in nothing. I would advise in the first bringing barren Lands to Fruitfulness, to use at least three Bushels to an Acre: afterwards one Bushel to an Acre is sufficient. It suits all Soils whatsoever, and the best Time of laying it on is with the Corn in sowing; for the first Rain thoroughly dissolves it: it then penetrates the Surface, and is of Use to the Shoot as soon as it is made.

## CHAP. XVII.

### *Of the Use of Sea Weeds as Manure.*

WE have not yet done with the immediate Products of Nature as Manures. I would have the Farmer perfectly acquainted with the Effect of every Thing that has been, or that reasonably may be used for this Purpose: for on these more than on any Thing, next to his Industry, depends his Success.

The Use of Sea Weed is confin'd to those Parts of the Kingdom which are near the Sea Coast, for it must be used in some Quantity: but it is an Advantage too many neglect, who

have it thrown as it were into their Mouths: and few that can be offer'd, are greater.

The Use and Value of Sea Weeds as Manure, depend upon the plainest Principle in the World. All Vegetables whatsoever are rich Manures when in a State of decay: Salt we have also seen is a very rich Dressing: now Sea Weeds have the double Advantage of their own Vegetable Nature, and of the Sea Water in which they grow.

Nay, there is something yet more than this in favour of their Richness. Curious Persons who have examin'd them according to Chemistry, have found that they contain much the same Principles as Animals: and it has since that been discover'd by the Help of Glasses, that they are always crowded with little Insects that live upon their slimy Surfaces, or in their little Hollows. This is so strongly visible in many of them, that some ingenious Persons both in ENGLAND and elsewhere, have suppos'd them not to grow as Plants, but that they were made by those little Creatures.

Now to consider the Sea Weeds in this Light, which is considering them truly, what a Right have they to the Husbandman's Regard as a Manure. First, from their Vegetable Nature, for they are really Plants, whatever those Persons may fancy: in the next Place, from their Saltiness; and lastly, and above all from their Animal Nature; for every Thing of the Animal Kind is rich in fruitful Qualities.

Let us examine by Practice whether these Reasonings are right; for all the Reasonings in the World are to be rejected that are not supported by Experience and Fact. Let us look into the Places where this Manure is used.

In DEVONSHIRE, upon and near the Coast, they use the Ouze and Mud drag'd up wherever they conveniently can get at it, as a Manure. They take this, Weeds and all, and let them rot together, before they spread them on the Ground: this is a very rich Manure, but in this Case the Benefit is laid to the Mud; the Weeds are not much regarded.

In CORNWALL, where the Shores are sandy or stony, and they cannot have this easy Advantage of Salt Water Mud, they tear off the Sea Weeds from the Rocks and Stones; and rake together such as are cast up by Storms. These they lay upon the Ground without any Preparation, plowing them in, and they enrich it to a surprising Degree.

The first Year many of the tough Kinds remain almost entire in the Soil; but they give a great deal of Fruitfulness to it notwithstanding: the next they generally break and rot, and they continue nearly equal in point of Fertility that, and the succeeding Year.

The first Year, the Salt and the little Animals that are about them, fertilize the Ground; the next, and the third, 'tis their own vegetable Substance which decays, and enriches the Soil; the smaller and tenderer Kinds the first Year with the leafy Part of the others; and the toughest and the remaining Stalks the last.

In some Parts of CORNWALL they pile these in Heaps, and cover them that they may rot before they use them. This makes them take Effect in a prodigious Manner the first Year,



but they do little the second, and the third less. I would advise the Farmer to use them just as he takes them up: for their first Effect in this Way is sufficient to satisfy his warmest Expectations; and the Benefit lasts longer.

Of all the Manures I ever saw used, I know none that is so quickly spent as rotted Sea Weed; but none takes a quicker Effect.



### C H A P. XVIII.

#### *Of Sea Shells and their Spawn as a Manure.*

**T**HE Farmer who has consider'd the Nature of shelly Sea Sand, as explain'd in its proper Place, will readily imagine that Sea Shells in any State may be used as a Manure. They are so in most Places where they can be had conveniently, and that in different Manners according to their present Condition.

Some are taken up fresh on the Shores; others have lain in Heaps expos'd to the Weather: some are hard and firm, others soft, brittle, and as it were, chalky; and these severally require a different Treatment.

Shells in a double Manner have Title to be used as a Manure. In the first Place, they have belong'd to Animals; and whatsoever has been a part of an Animal, or has any way belong'd to one, is sure to be useful to this Purpose: in the next Place, they are, after Exposure to the Air, of a limey Nature, and every one knows how rich a Manure every Kind of Lime is found.

The Shells taken fresh out of the Sea, or from the Shores, have a bright glossy Look, especially on their Inside, and shew frequently several Colours. Those which have lain to be calcin'd upon the Shores, are all over whitish, and have a dead Aspect, so that they are easily distinguish'd: they have somewhat the Appearance of Lime; and a Calcination by Fire in the common Way, soon brings one or the other to real Lime.

These are the three Conditions in which we are to consider Sea Shells as a Manure. 1. The fresh Shells; 2. The Shells that have lain on the Shores till they are calcin'd by the Sun and Air; 3. Shells calcin'd by Fire to Lime.

The Farmer is to use one or other of these according to the Nature of his Ground: the first and second are usually found in the same Places, so that he has his Choice: and he may make Lime of either at his Pleasure.

The Progeny or Spawn of Shell Fish, is a yet richer Manure than the Shells themselves. This is found under Rocks, and sometimes in vast Plenty in the Beds of Salt Water Rivers; and is full of diminutive Shells. It dissolves easily: and is so great an Enricher of poor Land, that scarce any Thing is superior. It is found to be so much above Dung, that the Farmers always, where it is to be had, reckon one Load of it equal to three of the other.

When the Ground is poor and heathy, Sea Shells are to be used in their natural State: and the fresh and lively Shells are for this Land better than those which have lain expos'd on the

Shore till they are bleach'd: but when a tough Soil is to be dress'd with them, the best Way is to calcine them to Lime. If natural Shells are used to a stiff loamy Soil, those which have lain till bleach'd, are better than the fresh: for they are reduced to a Condition resembling that of Lime.

No Shells are to be laid on the Ground whole, for in that Case they would obstruct the shooting of the Corn, and it would be many Years before they could give out their Virtue. The Farmer must break them with Hammers, or in a Mill before he lays them on the Ground, the smaller the better: for then the Air takes quick Effect upon them. Most Shells are made up of Plates lying one over another, and when the Air can get freely at the Edges of these, they split and shiver to Pieces; and then give out their Virtue to every Part of the Ground.

I have seen the Proof of this in SUSSEX; where Shells are used both Ways. I have taken up a Shell tolerably entire and sound, that has been laid on the Land three Years, by one who laid them on whole: and this in all that Time had obstructed the Growth of the Crops, and given no Virtue, for it was still tolerably firm. Whereas on a neighbouring Farmer's Ground who had ground his Shells in a Mill before he laid them on, nothing was to be found remaining of them but a few thin Shivers; these were as brittle and crumbly as the thin Shells we find in Marle Pits; and doubtless they are as rich as those.

These broken Shells had been laid on no longer than the whole ones in the other Man's Field; and I doubt not but in another Year, there was not a Scrap to be found: whereas the others would probably remain whole for the Man's Life.

As the Shells that have lain to be bleach'd on the Shores, fall to Pieces much sooner than the fresh ones: it may be right where the Nature of the Soil renders Lime improper, and where only fresh ones can be had, to calcine them a little. Half an Hour's gentle Fire will do as much to this Effect, as some Years lying upon the Shore: and the hardest Oystershells, and the like, may be thus made soft and crumbly. They will then easily break under the Hammer, or in the Mill, and will dissolve upon the Ground in a Season or two, though their Effect will be seen in the Crops for a great many Years.

Those who have understood best the Nature of Manures, especially those of the richer Kind, have agreed, that they cause the great Fertility which always follows their Use by raising a Ferment in the Land; and so dividing the Lumps, and loosening and mellowing the Soil. If this be the Case, as appears very probably, then Experience shews, that Sea Shells, properly manag'd, are the richest of all Manures, for none loosen and mellow the Earth in such a Manner.

A thorough Dressing of Shells enriches the Land for many Years, and indeed too much at first, for after a few Seasons when they are well dissolv'd, they make a Soil that was before stiff, so light and loose, that like the moory Land in LINCOLNSHIRE, or the fine black Mould in other Places, it is not able to support the Roots of



of the Corn. In this Case the Farmer is to lay it down for Grass for a couple of Years, and then plow it again. It bears excellent sweet Grass in the Time it is laid down, and afterwards has Body enough to support a Crop of Corn which before it could not.

The Allowance in general where they can be had in Plenty, is twenty Loads of Shells to an Acre: when they are burnt to Lime, they take Effect the most suddenly, but it does not last long. When they are calcin'd a little so as to make them crumbly, they affect the Land gradually, and their Virtue will last very well twelve or fourteen Years: when they are used in their natural Condition, the Effect is slower: those which have lain expos'd till they are bleach'd, exert themselves quicker than the fresh ones; and these last, as before observ'd, on some Lands hardly ever take Effect at all.

My Advice to the Farmer is always to use this Method of half burning the Shells, unless upon those barren and cold Soils where they do best as Lime: the other Way they take Effect too slowly, and in this Manner, though speedy, they are lasting enough in Reason.

In CORNWALL they use the bleach'd Shells mostly, and their Effect is very strong for ten or twelve Years; in DEVONSHIRE they have principally softer and brittle Shells than in CORNWALL, as small Cockles and Razor Shells: they spread these as they find them, and they do very well. About PLYMOUTH the Shells are mostly of the Muscle, and other thin Kinds, and they use them fresh as they find them, only breaking them with an Iron Stamper, and they do well enough; but in all these Places they would answer a great deal better with a little Calcination.

In IRELAND they use the fresh Shells from LOUGH FOIL, or the Bay of LONDONERRY, bestowing fourscore Barrels on an Acre, and the Archbishop of DUBLIN, has given a surprising Account of their Fertility; which is publish'd in the Philosophical Transactions. He also observes their Effect in hollowing and loosening the Ground in the particular Manner already mention'd.

The Advantage that the Farmers about our Sea Coasts in some Places, make by this Shell Manure is so great, that I hope nothing is wanting to tempt all those who are within the Reach of it, to use it. I have seen this as well as the other Benefits offer'd by Nature, neglected so often, that I think too much cannot be said to spirit up the Farmer to employ them. Of this I am sure, more cannot easily be said in their Favour than is true.



#### CHAP. XIX.

##### *Of Parts of Trees and Plants used as Manure.*

IT has been observ'd in a general Way already, that all Vegetable Matter when it rots and decays, becomes a Manure greatly enriching Land, and seeding the Crop that is sown upon it. In this Chapter I shall for the

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farther Assistance of the practical Husbandman, mention the several Particulars which are most ready and most useful in this Kind.

All large Weeds are excellent to mix with Dung in the Yard, or in a Pit, as already mention'd; and the most juicy are the best. They must be cut up before they run to Seed; and the more perfectly they are rotted, the richer they prove, and the readier for the Farmers Purpose.

Dead Wood, which is found in some Quantity in Forests, and is so rotten that it will snap, and almost crumble between the Fingers, is an excellent Manure. The Branches of Trees that lie cover'd with Leaves, and the decay'd Stumps of others that are reduced to a blackish Matter, which is light and spongy like Touch-wood, which are not uncommon in damp Places, should be collected by the careful Farmer for this Purpose.

I have never seen these used alone except in LINCOLNSHIRE, where I saw a Piece of Corn Land upon the Edge of the Fens, manur'd with decay'd Willow Stumps beat to Pieces with a Beetle: but about CHARLTON FOREST in SUSSEX, the Farmers buy the rotten Branches of the Trees, as before mention'd, of poor People, who pick them out of the lower Parts of the Forest, and mix them with their Dung.

The SUSSEX Farmers agree, that nothing enriches their Soil so much as these dead Branches; and I am a Witness in the other Instance, that rotten Willow Wood alone is a prodigious Improver of Land, for I saw the Crop, which was a very fine one, though the Land was naturally but indifferent.

The Farmer should at leisure Times employ his People in getting together Weeds and decay'd Wood to add to his Dung, if it were only to encrease the Quantity; for there is hardly an Article of more Concern to him in all his Business, than the making up enough of his Manure. But beside the Advantage of encreasing the Quantity, these Things certainly add to the Richness; and that for two Reasons: as decay'd Vegetables are themselves a very fine Manure; and as a Mixture of Manures of these Kinds always adds to the Strength of both.

The decay'd Leaves of Trees are worth his Regard also: they add but little to the Quantity, but they very much enrich the whole.

The Barks of Trees are as serviceable for Manure as any other Part, and their Virtue lasts longer. Not only the naturally rotted Bark is excellent for this Purpose; but that which has been used by Tanners: this gives a very great Fertility, and its Effect will continue several Years.

Wood that is any Way brought to a State of Decay, will equally answer the Farmers Purpose. For this Reason Saw Dust is always useful; for a little Wet, or a short Effect of the Weather perfectly decays it; and the Effect is more speedy than that of Tanner's Bark; but it is not so lasting. Malt Dust; and Oil Cakes are also useful in the same Way; and when the Farmer can get them, he never should neglect the Opportunity.



It depends upon Accidents whether the Farmer can have these last mention'd Articles in any Quantity; but wheresoever they fall in his Way, they are a great Benefit, and he knows little of his own Interest if he neglects them.

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## CHAP. XX.

### *Of Parts of Animals used as Manure.*

FROM the Parts of Plants we naturally come to those of Animals; all which, as they are of a rich and fertilizing Nature, deserve the Farmers Regard as Manure. A proper Attention has been shewn to several of these of late; and many Things never before thought of, have been introduced as Manures, especially in the Neighbourhood of LONDON.

Indeed the Convenience of having Manures of particular Kinds, is a very great Article: some fall in the Way of one, some of another; but he who would make the best of his Land, must have a thorough Knowledge of all the Kinds, that he may take what he can procure: and in this never let him concern himself whether the Thing have been ever used by his Forefathers, or their Neighbours. For what is good Manure in KENT, is sure to be the same in SOMERSETSHIRE, or elsewhere, provided it be applied to the same Kind of Land.

In particular as he will here see a Detail of a great many Parts of Animals, which are in different Places used as Manure, let him lay hold of any that he can, though never used in that Country before. Nay farther, as he finds so many different Parts of Animals are used, let him in general be sensible that any other may. He may be assur'd, that every Thing of the Animal Kind will enrich his Land; and therefore let him freely use any that falls in his Way, for whatever it be, he may rest assur'd of Success.

He will find that whether Chance or Judgment directed People at first, they do in all Places use as Manure such Animal Substances as come in their Reach; and let him do the same whether any others have done it or no.

Upon the Coasts of NORWAY they dress their Land with the Refuse of the Fishermens Boats, who cure great Quantities of Cod and Herring for Exportation. In NEWFOUNDLAND they do the same: and in both Places the Success is very great, no one Thing in all the List of Manures being richer. These People have not learn'd of one another: but Accident, or Knowledge of the Nature of Things, has instructed both. Let the Farmer who lives in the Way of this Manure, from these Instances know its Value. Perhaps one of the Advantages of the present nobly establish'd Herring Fishery, may be the enriching some of the worst Lands in these Kingdoms by means of this Refuse.

The Farmer who lives in the Neighbourhood of a large Market Town, may with great Profit traffick with the Butchers, and all other Persons who can furnish him with the Refuse and Offal of Oxen, Sheep, and other Animals; the

the Blood, Hair, and every other Kind of rejected Matters being rich for his Purpose.

Wool-nippings, the Refuse of Rabbits Skins, call'd Coney Clippings, and the Hair of any Creature whatsoever, are fine Manures.

These last named Articles are of that Kind that do not give a very lasting Richness, though great for the Time. The Farmers in many Counties, however, know the Value of them so well, that though their Virtue is quite spent in a couple of Years, they find it worth while to buy them at seven, eight, and sometimes nine Shillings a Bushel.

The Way of using these is to spread them thinly and evenly over the Ground, at the Rate of about thirty Bushels to the Acre. The first Rains wash in their Virtue. And the Crop sufficiently shews its Excellency.

Next to the Hair it may be proper to mention the Hoofs of Cattle, and other tough Parts, which may be had as Refuse. No matter what Creature they belong to, they are all equal in Richness.

The old Writers on Husbandry say the Farmer is to use only the Hoofs of such Creatures as chew the Cud; but that is an idle Fancy, all Hoofs are of the same Efficacy, and the only Difference is, that the thinnest, and those of the youngest Animals enrich the Ground the quickest, and the thicker and tougher have the more durable Effect: though they are all very lasting Manures.

The best Way of using these is to spread them upon the Land, some time before plowing, that the Weather may dispose them to part with their rich Parts; they are then to be plowed in, and the Land will have the Advantage of them fifteen or twenty Years.

These Manures agree with all Sorts of Soils.

The Horns of Cattle are too tough and cumbersome to be laid upon the Land, in their natural Condition, but they have the same enriching Quality. Shavings of them are to be had at the Horners and Lanthorn-makers in London, and these are so thin that the Weather is able to affect them. The HERTFORDSHIRE Farmers are well enough acquainted with the Value of these Shavings, and where to get them. Though they pay a large Price for them, they go a great Way and last a great while, so that it answers very well.

The Way of using these is to strew them thinly and evenly over the Land, and after a Time plow them in; they mellow the Earth gradually, and encrease the Produce in a Manner that is surprising.

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## CHAP. XXI.

### *Of Dung in general, as a Manure.*

HAVING, in the last Chapter, treated of the Parts of Animals, as they may be made useful in the Improvement of Land; we naturally come next to their Excrements, or Dung; which furnishes the great standing Article of Manure throughout the Kingdom.

However sensible the Farmer may be of the general Use of Dung already, there is a great deal to be said of the particular Kinds; and their distinct



distinct and separate Uses: for there is as much Difference between one Dung and another, as between Chalk and Marle, or many others of those already mentioned: and there requires as nice a Judgment in suiting the Kind to the Soil; and in the proper Time and Manner of using it, as in any Branch of Husbandry.

The Dung of different Creatures, though it be all rich and valuable to the Farmer, yet is rich in different Degrees; and suited, according to its Kinds, to different Purposes. I shall endeavour to inform the Farmer thoroughly in this Article of his Profession, under its distinct Heads. But first, it may not be amiss to give him some general Notion of the Nature of this capital Manure, and the Manner wherein it enriches or operates upon the Land.

And first, the very Purpose of all plowing and all manuring of Land, is to divide and break the Body of the Soil, which is, in most Kinds, naturally too compact: for the more the Body of the Soil is broke and divided, the more free Passage the Roots of Plants have; and the more they have the Advantage of it.

In plowing, this breaking and dividing of the Body of the Land, is done altogether by Labour; but in the Use of Dung it is done by a Kind of Fermentation. We know that all Dung is naturally disposed to ferment; and we are sensible also, from Experience, that what is liable to ferment of itself, will ferment and work up a large Quantity of any proper Matter among which it is mixed.

We see a little Yeast ferment a great deal of Dough; puffing it up and rendering it lighter: and in the same Manner Dung works up and loosens the Ground. This is what makes the Soil mellow; and this is the natural and real Use of Dung; and the Way in which it makes Land fruitful.

We see an Instance already recited, of the Way in which the Use of Shells mellows the Soil; making it sometimes so loose and crumbly, that it has not Body enough to hold the Roots of the Grain. The same is the Effect of Dung, only more moderate; as we commonly use it: Experience having, in general, guided Men pretty well in the Quantity, though not sufficiently in the Choice.

We may perceive this is the true Use of Dung by this, that Plants of all Kinds grow much better upon Land that has been dung'd; than they will upon an Heap of the Dung itself. So that it is plain the Dung does not directly nourish the Crop itself, but it makes the Earth more fit to nourish it. This is done by breaking and dividing the Earth, and no otherwise.

This may set the Farmer right in one essential Article; that is, the Manner wherein he is to dung his light Soils: of this I shall speak particularly hereafter, but in general, pure Dung, laid upon a sandy Soil has no Effect, because dividing the Soil is not what is there required. The little Stones of which Sand is composed, are not join'd together; and Dung has not the Power of breaking or dividing each separate Grain.

Even in the Gardener's Grounds about London, where they force their Herbs to grow, in a

Manner, in Dung, we see the bad Effect it has on them. A Gardiner's Turnep has not half the Sweetness of a Field Turnep: and it is well known that the Water which has boil'd one of these Dung Cabbages stinks, whereas there is no ill Smell, but rather a musky Sweetness, in that wherein a Cabbage has been boil'd that has grown in a more natural Soil.

The Farmer will never dung his Fields in that abundant Manner, but if he should, even the Corn would have a Taste of it; this suffices to shew, that the true Use of Dung, as said already, is to fit the Earth to afford Nourishment, in the fullest Manner, to a Crop; and not to yield that Nourishment itself.

But beside this natural Effect in breaking and loosening the Soil, there is another very considerable one in all Dung, when properly laid on the Ground; that is, the giving a Warmth to the Land, and cherishing the young Shoot. This is owing to the same Cause, the Fermentation of the Dung, for that is the Occasion of the Heat it has in itself; and which it so freely communicates to every thing about it. This may afford a Hint to the Farmer, as to the Time of laying on his Dung, of which more hereafter.

But as Dung thus naturally renders a Soil warmer than it would otherwise be, it may also make it colder; and it has been observed, that whole Fields of Wheat have perish'd by Frost on dung'd Lands, when they have liv'd through the Winter on those Lands of the same Soil, that have had no Dung that Year. It is possible this may have arisen from the Cause to which it has been attributed, that is, to the Hollowness of the dung'd Ground in which Water lay about the Roots of the young Corn, and then freezing, kill'd it: But more Observations ought to be made before this be received as an universal Fact.

It must be farther observed, that Mr. TULL is the Person who delivers this Account, and his Prejudice to Dung might carry him too far. He wrote to establish the Use of a particular Kind of Tillage instead of Dung, so that he may be considered as a prejudiced Person. I shall add, on this Occasion, an Observation which the Farmer will do well to carry with him on all others. That is, that we are to read what is written by Persons who propose Systems, with great Allowances for Partiality. Well supported Facts may be received, whoever relates them, but Men may have been blinded by their Prejudices, when they argue from single Experiments of their own. I am sorry to see, the few who have meddled with this Subject since Mr. TULL's Book, all take up his violent Prejudices against Dung. They have considered him as an ingenious, but they should also have considered him as a prejudiced Writer.

Some Lands bear Dung better than others; and in the same Manner certain Soils require particular Kinds; or a proportioned Quantity of that Manure. In this Part of his Business it is that the Farmer wants to be instructed, not as to the Nature of Dung itself, which he full well knows; and which I hope he will continue to esteem his own Way, and as his Fathers used to do, in spite of all the Charge of Folly and Obstinacy brought against him by partial Writers; who, while they

accuse



accuse him of Ignorance, often know much less than himself.

Let him continue to esteem Dung the readiest and most universal of all Manures, for such it certainly is: and in order to use it to the fullest Advantage, let him observe the Cautions and Directions that will be here laid before him. He may then tell these Enemies to Dung, that all the Accidents they lay to the Charge of that Manure, are owing either to a wrong Choice of the Kind, to a wrong Proportion of it to the Land, or a wrong Management of it in preserving or laying it on. And these are the Errors against which I shall attempt to guard him, by what I have seen in my own and others Experience.

To say Dung often does Mischief is to say true, but then it is in unskilful Hands: but to rail at Dung as always hurtful, were to fly in the Face of all Authority, and all Fact; and to reason against Experience.

I am sorry to acknowledge this has lately been done by too many, but they are all blameable for it: they have all done it in Favour of some other Manures, or of some particular Kind of Tillage. This is to write partially. I have already given a very full Account of many, and shall, in the succeeding Chapters, of all the other Manures; and the same of every Kind of Tillage; but doing them Justice, let us do Justice also to this. The present Fashion of railing at this Manure is enough to mislead half our Farmers.

It is certain that all Soils do not equally require, nor will all equally bear Dung. This Reason dictates, and this Experience affirms. For Instance, if the Effect of Dung be to divide and to warm the Soil, Reason will affirm that it is not so needful on those Soils, which are hot and loose already, as on those which are cold and compact, or tough. And Experience confirms Reason; for speaking in general, Dung is not so useful on sandy as on clayey Lands.

In the same Manner all Times are not proper for the laying it on, nor is every Condition of this Manure proper for every Occasion. For if Dung be left, when rotten, upon the Surface of the Ground, the Sun and Rains will exhaust all its Virtue: and, in the same Manner, if it be bury'd too fresh, and in too large a Quantity in rich Soils, it will occasion Weeds.

All this is true; and from this have arisen the general Complaints and Cautions against Dung. But as that Manure is useful, in the highest Degree, I shall, instead of condemning it in general, for the sake of these particular Mistakes which may happen in the Use of it, shew the Occasion of those Accidents which sometimes attend it. I shall point out to the practical Farmer, the Soils to which the several Kinds of Dung are fitted; and the Manner of preserving, and the Seasons of applying them: by this Means teaching him how to prepare his Manure for his Soil, that he may reap its Benefit, and escape the Misfortunes others suffer from its ill Management.

Having thus led the practical Husbandman through a general Consideration of Dung, as a Manure, I shall treat separately of the particular Kinds,

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## CHAP. XXII.

### *Of Horse Dung.*

**H**ORSE Dung, though the Name expresses but one Thing, may be divided into several Kinds: and it must be so in order to give the practical Husbandman a full Information of the Uses to which it will serve.

The Differences between the Dung of various Animals, which are very great, as will be shewn in the succeeding Chapters, depend principally upon the Food on which the Creatures live: the Dung of those which feed only on Flesh being of one Kind, that of those which feed on Herbage only, of another, and that of those Creatures which eat both Kinds, being of a middle Nature between the other two; and sufficiently different from both. It is natural Dungs should thus differ, because the Office of Digestion is of the same Kind in all Creatures: so that the Matter digested must make the Difference.

Now tho' Horses feed altogether on Herbage and Vegetable Products, yet there is a great deal of Difference between the green and moist Grass they eat on Pastures, and the dry Hay in the Stable. The Corn also is another great Article in the making of his Dung: but this is not all the Difference. If we spoke only of the Dung pure, and as it is voided, we should easily conceive there must be these Variations; but we generally mean by Horse Dung, that which is mix'd with the Straw or Litter; and we are also to consider it as it may accidentally have other Mixtures.

To come to a perfect Knowledge of this Manure, we are to consider it then in three Conditions. As pick'd up pure and entire; as taken out of Stables, and as swept and shovelled up from the Roads; which last, though not a common, is an excellent Practice. In these three States we find the Dung pure, mix'd with Straw and Urine, or mix'd with Urine and Dust.

These single Circumstances make a great Difference; but a great deal more is also made by the Time when it is used, whether that be while it is fresh, or after it has been drop'd, or lain mix'd some Time.

To give the Farmer a general Notion of this Difference, pure Dung is moderately warm; Dung from the Stable, when it has got into a Ferment with the Straw and Urine, is hottest of all; and the dry Dung of Roads, though it has little Heat, has yet a great deal of Fertility.

There is also a vast Difference between the Dung of the Stable, (which is the most commonly employ'd) when it is in a State of Fermentation, and when it has gone through that, and is well rotted. In the first Condition it is often too rank, and less than the usual Quantity should be given when it is taken at that Time; but when mellow, it has sufficient Fertility. Of all these Accidents and Considerations, we hope to give the Reader the Means of judging fully: and we are assur'd that when the several Conditions of this Manure are better



understood, and more regarded, there will be few Complaints of its ill Qualities.

The Physicians when they order Horse Dung as a Medicine, always particularly direct that of Stone Horses to be used. They have Reason for what they do; and the Farmer will have the same Reason for giving the like Preference in his Uses of it as Manure.

It is not only that Stone Horses are usually more vigorous and spirited than Mares or Geldings, that makes their Dung preferable: but in general there is a Difference in the feeding; the Stone Horse being most commonly kept up to dry Meat in Stables.

The Dung of any Animal consists of the grosser Parts of its Food, mix'd with the Juices of the Mouth, and Stomach, and the Gall. It is therefore a Mixture of well ground Vegetable Matter, and Animal Juice, which must make it very rich. And it is plain from this, that the stronger and heartier the Food, the better and richer will be the Dung.

Therefore the richest Horse Dung is that of Stable-kept Horses, well fed with Hay and Corn; and this gets great additional Richness from the Urine, which in a well-contriv'd Stable mixes among it. The Stable for this Purpose should be well paved, that the Moisture may not soak into the Ground, but mix with the Dung and Litter.

It will be found upon a critical Enquiry, that every Thing the Farmer sees in the Nature and Effects of Dung, agrees with and supports this Account. The Dung of Cows is colder than that of Horses, because Cows in general feed on Grass: that of Horses is warmer because of their Hay and Corn, and the Dung of Fowls is the warmest of all, because they feed in a manner on Corn only.

For this Reason Horse Dung is fittest for cold Lands, and Cow Dung for hot: and in the same Manner, Experience will always confirm right Reasoning.

The Dung of our own Species is by many extolled beyond all other; and doubtless it exceeds all in Strength and Richness, because of the Flesh we eat: and Swine's Dung is also extremely rich, because of the Animal Part of their Food; they eating partly one Kind, and partly another, as it is offer'd to them.

Notwithstanding that it has been so much a Fashion of late to rail at Horse-Dung, all own that it has great Effects. The old Writers attribute the Fertility it gives to Lands, to its being of a Nature fit to attract the Nitre of the Air: and Mr. TULL attributes it altogether to its Fermentation, which breaks and divides the Ground: and this Fermentation he says is owing to the Salts with which it abounds.

Mr. TULL's seems the plainest Account; but perhaps there is Truth in both. Whatever be the secret Cause of the Operation of Dung in making Land fruitful, for a Secret it is yet, notwithstanding all that has been written about it, it is plain from all Accounts, as well as from Experience, that it has such an Effect; and it will become the Farmer to know exactly in what Manner to regulate it to his Occasions. To this I hope he will be led reasonably, by

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what has been here written of Horse Dung, which is the Kind that is commonly understood by the Word Dung, when used generally; and by what has been written of that Manure in general in the preceding Chapter: so that after such Preparation, we may advance to the Manner of treating and using this Manure.

Horse Dung may be too poor from its having too much Litter among it; and from its having lain expos'd too long to the Sun and Air. In this Case a great Quantity of it is required to answer any Purpose; and the best Way is not to use it alone, but to mix it with other Dung, where it may get into a new Fermentation.

It may also be too rich, as when the Litter is well proportion'd, the Urine all soaked into it, and the Fermentation high. In this Case it will occasion Weeds and Insects wherever it is laid; it should therefore be tempered with a proper Quantity of Earth well mix'd among it before it is spread. This at once encreases the Bulk, which is a material Article, and takes off its Rankness.

From what I have seen in my own Experience, I prefer the mixing of Earths with Dung upon every Occasion, to the common Method of laying the Dung on alone. I am sure every Farmer will find the Advantage who will try.

But in this let him take Care to suit the Earth he mixes with his Dung, to the Land on which it is to be laid. I have already shewn, that one Soil may always be a Manure to another. Let the Husbandman keep that in his Mind; or turn back to those Pages. He will there find, that if it be a sandy Soil on which his Dung is to be laid, a clayey Earth is best for him to mix with it; and if it be a clayey Soil, a sandy Earth, and so of the rest. Carefully minding this, he will at the same Time, by mixing Earth with his Dung double or treble the Quantity of his Manure, take off the Rankness of the Dung, and give a double Dressing to the Land; the earthy Part of which will remain in great Effect, long after the Dung has spent itself.

I know that the common Method is to advise the Farmer to mix Wash, Weeds, and many other Things with his Horse Dung in the Heap; and to add Earth to Sheep Dung, by laying it under them in the Hovel; as will be observed hereafter. But I am for extending the Practice of mixing Earths to both Kinds, for I have found it as useful with one as with the other.

Dung in itself is too rich for any Soil. I believe Mr. TULL is right in attributing the great Advantage that arises from the Use of it to its fermenting with the Soil; and I have found by Experience what is very natural to conclude from Reason, that it will spread this Fermentation farther, by beginning with a little Earth first. The Soil that is already mix'd with the Dung, gets into a State of Fermentation before it is laid upon the Ground; and as soon as it is plow'd in, that works upon the rest.

A great deal is to be consider'd in the keeping and preparing, as well as applying of Horse Dung. As to the three Kinds already distinguish'd, the Farmer will find the most frequent Use for the Stable Dung, or that mix'd with

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Litter



Litter and Urine. For the others, the Use of pure or entire Horse Dung must be on Grounds that require but moderate heating, with the Addition of their Fertility. The Road Dung is to be used where Fertility is wanting, and not Heat; for of the latter it has very little.

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### CHAP. XXIII.

#### *Of Horse Dung used singly.*

**T**HE Use of pure Horse Dung is in a Manner confined to Pasture Grounds; and that of the Roads to Corn Lands of a clayey Soil. On these two Heads I have some Things to add from my own Practice, which I hope will be the more agreeable to the practical Husbandman, as they have not been enough regarded by others.

In the first Place, as to entire or pure Horse Dung, I one Year made my Man take up all the Dung they drop'd as they went along, and lay it up in a Place under Cover. When a large Heap of this was collected, I had it crumbled to Pieces, and strew'd thin over my Meadow and Pasture Grounds, in the fair Hours of a dripping Spring; the Rain wash'd it in, and the Encrease and Richness of the Grass was surprizing.

The next Experiment I made with it was, by strewing a large Quantity of it over a Field of Corn, in the Manner the Farmers call sowing of Dung, and as they use Pigeons Dung in many Places: but I must own this did not at all answer my Expectations. I apprehend that its light and dry Nature, where it lay expos'd upon a naked Field, made it lose all its Virtue without entering the Soil. But I set down both the Experiments just as they are: that the Farmer may know what it will not do, as well as what it will.

Now as to Horse Dung taken from Roads, I have experienced that two Ways, and shall in the same Manner relate the different Effects. I have a Field not far from a Place in the great Road, where the Horses stand to stale, and they drop their Dung often in the same Place. I have got the Shovelings of this Part of the Highway for my Field two Ways; and the one it was prejudicial, the other very advantageous.

First of all I had it taken up at a dry Time, when it was almost all like Dust. This tasted saltish, and I could perceive it was a gritty Powder, with a great deal of dry Dung among it, and some remain of the Urine. The Land I laid it on was a cold clayey Soil, and it answer'd in great Perfection. The Grit breaking the Clay, at the same Time that the Remains of the Dung, and the Salt of the Urine, warm'd and enrich'd it. At another Time I had it taken up when it was redish colour'd, and as soft as Pudding. It was spread directly over my Land, which was plow'd in upon it, and Rains coming on, the whole Virtue was kept in, and wash'd into the Soil: but this did great Harm to my Crop, being too strong of the Urine. Many Things assist the Growth of Plants in a moderate Way, but will destroy them in too

great a Quantity. From that Time I have kept to the Use of the Road Dung tolerably dry, and have always found great Advantage from it. And I have kept my Heaps of pure Dung for my Pasture, moisten'd by having the Chamber Pots emptied upon them; and I have found this answer to my own great Satisfaction, and the Surprize of all the Neighbours.

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### CHAP. XXIV.

#### *Of Horse Dung made into Compost.*

**H**AVING now done with these two Conditions of Horse Dung, I come to speak of it practically, in the Way wherein it is ordinarily used; that is, as mix'd with Litter and Urine: and indeed the more Ingredients are for this Purpose mix'd with it, the better. The antient Writers on Husbandry have laid down a Plan for the improving Horse Dung this Manner, which the latest have very prudently copied from them.

The Benefit of Dung in the usual Way, is not owing to the Richness of the Excrement of the Horse alone, but to its State of Ferment with Straw and Urine. Now this Ferment, and this Richness, may be both encreas'd: nor is there any one Article in all the Farmer's Practice, that is more necessary to be thoroughly consider'd.

The Virtue of Dung may be improved, and preserved: to both these Things the Farmer is to attend. It will be improved by mixing with it all Kinds of Things that have an Animal Tincture, or Vegetable Matter that will rot with it, or that contain any Salt; and it will be preserv'd by keeping it cover'd.

MARKHAM very properly advises the Farmer to pour continually upon his Heap of Dung, all his Beef Broth, Brine, Soap Suds, and the like; by which Means, he says, truly, one Load will be worth five; and in general these Writers condemn with Justice, the naked and expos'd Manner wherein the Dung is kept; by which Means the best Part of its Virtue is lost before it is carried to the Ground.

On these Principles the intelligent Farmer will readily follow the prudent and common Advice to keep his Dung cover'd, and to add to it every Thing he can, which will in general give new Virtue, as well as encrease the Quantity. I hope to shew him how to use Dung to twenty Times the common Advantage; and to avoid all the Mischiefs that frequently happen from its improper Use.

First, for the preparing of it according to these Principles, let him dig a Pit of Depth and Bigness proportion'd to his Quantity of Soil. This must be well paved, and wrought up the Sides, that no Moisture can get through, and arch'd over at the Top to keep all close; with a Door for taking out and throwing in the Dung. The draining of the Stable and Cow-house should run into this Pit, and into it all the Dung and Litter from the Stable is to be thrown; and the Bottom of the Stable and Cow-houses paved hard, that the Urine may not soak in,



in, but run through the proper Channels into the Pit; and if the Chamber Pots be daily empty'd into it, so much the better.

Beside the Horse Dung, all the Cow Dung, Hog Dung, and that of all other Kinds, if not enough to be sav'd alone, or not wanted alone, is to be thrown into this Pit; and all the Refuse of the Garden, Cabbage Stalks, and the like; and the Ashes from the Kitchen; the Earth cut up in cleaning of Ditches, and the like: and into it should also be emptied, the Wash, Soap Suds, and all other Refuse. The whole is to be kept of such a Degree of Moistness, as to assist in the Fermentation, and no more: and thus every Thing will be made useful. The whole Spirit of the several Materials will be kept in, and the Mixture will be mellow'd in a surprizing Manner.

Old MARKHAM who laid the Plan of mixing these Matters with Dung, says, one Load will be equal to five; later Writers say, one will be equal to twenty, but the Farmer must take Care how he depends too much upon these large Promises.

I shall propose to the Farmer upon the foregoing Principles, an Addition to this, which will be of more worth than all. When he has got his Quantity of Dung thus rotted and mellowed, let him throw in at least three Times its full Quantity of Earth. Thus the whole is made four Times what it was, and every Load will be as good as a Load of the entire Mixture. Let him not spare the Expence or Trouble of mixing the Earth well with the rest: when that is done, let it lie together about a Week, in which Time it will ferment and mellow, and will then be fit to lay upon his Land to the greatest possible Advantage.

I will not say this Compost is not subject to breed Worms, for all rich and mellow Soils will have them; but it will breed fewer Weeds than any.

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#### C H A P. XXV.

##### *Of the laying on of Dung.*

**N**OW whether it be this, or any other Kind of Dung that is used, there is a great deal of Benefit, or Loss, from the Time and Manner of laying it on the Ground. Some, beside exposing it to the Weather while in the Heap, let it be spread out upon their Lands a Month or two before it is plow'd in: but this is a great Error; for by this Management, the Sun and Air exhaust almost all its Virtue, before it gets into the Ground; so that a large Quantity has very little Effect.

Others lay it on in little Heaps, and let it remain so a good while before they spread it. This is not so weak a Practice as the other; but it is throwing away a vast deal of the best Part of the Virtue.

In Land that has three Plowings for a Corn Crop, the Time of laying on the Dung is just before the second Plowing: and in the Way I have advis'd, let it be carried from the Pit after

six or eight Days mellowing with the Earth: and let it be spread as soon as it is laid on; and plow'd in as soon as it is spread. This is the Way to preserve all its Virtue; and when manag'd this Way, it is amazing to see what Effect it takes upon the Soil. And the Farmer will hence know how to use it on all plow'd Lands.

When it is for Pasture Grounds, another Method is required. To the Mixture of the Dung and Earth, let there be added an equal Quantity of River Mud; and let a Heap of this be cover'd with fresh Turf, that it may sweat and mellow together. When it is thoroughly mix'd and short, it is to be spread thin on the Grounds before Rains, and it will all dissolve, and be carried in to the Soil in such a Manner, that only a few Straws shall remain.

These are the general Rules for the Management of Horse Dung, whether used of itself, or made the Foundation of a Compost: but general Rules cannot suit all Particulars; and that Advice which is useful to one Farmer may be injurious to another, unless proper Cautions be added.

Thus if the Farmer who uses Horse Dung in the common Way, fears Weeds; let him lay it on his Ground when a little cooled. If he want its utmost Warmth and Strength, he is to use it fresh, and in all its Vigour; and in this Manner his own Prudence will advise him on a great Variety of Occasions, remembering the general Directions.

When Dung is to be laid upon a Summer's Fallow, the proper Time is just before the twy Fallow, spreading it just before the Plowing, that it may be cover'd in, and be buried to mellow the Ground about it till the twy fallowing, when it will be rais'd again, and mix'd by this Care in a due Proportion. The great Misfortune attending the Use of Dung is, that it affects only a small Part of the Soil; but this Practice is a Remedy for that, twice the Quantity at least of the Land falling under its Influence, in this Method of using it.

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#### C H A P. XXVI.

##### *Of the Virtue and Quantity of Horse Dung.*

**W**HEN the Farmer who has been us'd to fill up his Field with Weeds by his dunging it, lets that Manure lie till it be rotten before he lays it on, he avoids that Mischief: but at the same Time he loses a great Part of the Virtue of his Dung. However, the Land that is so ready to be over-run with Weeds is rich, and therefore requires the less Assistance: so upon the whole this will do. Thus the considerate Man is to take a View of the Matter before he judges any Thing.

There is another Fault in Dung which the Farmers in general are less aware of, though it happens in the same Kind of Lands. When Dung is improperly laid on a rich Soil, it not only promotes the Growth of Weeds, but it makes the Corn itself rank in the Stalk, and thin in the Ear. Nothing is so easy as to do

Mischief



Mischief with Dung. In this Case mellow Dung, used in Moderation, is the right Practice. The Farmer should never lay his Dung on this Kind of Land till it is rotted to mould, and then not more than fifteen Load on the Acre.

'Tis for this Reason that old, mellow, and rotten Dung is so often mentioned in the preceeding Chapters. It is oftener required than fresh, on many Lands. And for want of this Knowledge, the Farmer who follows, as he thinks, the Practice of his Neighbours, without regarding his Soil, often injures his Land by the great Expence of dunging it improperly: and knowing no other Method of assisting it, he has Recourse to Dung again, and so ruins it entirely.

The Expence of Dung is very great; and the Farmer often foolishly makes it much greater than it need be. He thinks if Dung be right, why then the more of it the better: but Dung is a Medicine that kills in an over Dose. Neither is there any Use in encreasing it, when it does not amount to a mischievous Quantity; for three Crops will exhaust the Virtue of any Quantity of Dung whatsoever. Twenty Load to an Acre is the full Proportion that ever need be allowed.

There is no Grain with which fresh Dung so well agrees as Barley, it is so natural to this that it does better pure than with any Mixture, and it does best of all upon an Etch Crop. In the succeeding Fallow the Dung will be perfectly mix'd with the Soil, and have Time to ferment with it. After this the Land will be fitter for Wheat than by any other Management whatsoever.

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## CHAP. XXVII.

### *Of Cow Dung.*

**T**HE several Dungs have their particular Natures, and several Uses, the latter depending on the former. As Horse Dung is the Manure for cold Lands, Cow Dung is the proper Dressing for hot Soils, this is the common Doctrine, and there is some Foundation for it in Truth: not but that all Dungs are, according to the Sense of the Word, hot; only the Degree is different. They all act upon the Soil, by fermenting with it; and these Fermentations are always attended with Heat. The Chemists mention some Fermentations in their Liquors, that are attended with Cold; but none of those in the Dung made with the Soil are of that Nature.

In speaking of Horse Dung I have already explained the Occasion of Heat and Coldness in the Effect of Dung in general. As the highest fed Horses afford the richest and warmest Dung from their dry Food and Corn; it is natural, by the same Rule, that Cow Dung should be cold in Proportion, because the Creature feeds, in general, upon green Pasturage: yet still, as Dung, it has some Heat and Virtue.

Under the common Article of Cow Dung, the Farmer includes that of the Ox, and others of the same Species.

The best Use that can be made of this Dung is, the mixing it into a Compost with the Horse Dung and other Refuse, as before described. And though it has less Effect than almost any other

Kind when used singly, yet nothing enriches a Mixture more. Let me acquaint the Farmer with what I have learnt from Experience.

I have said before that, on many Occasions, Dung which has lain together till it is mellow and rotted, is better than such as is fresh. This gives a more slow but more general Fermentation to the Soil, than hot fresh Dung; and at the same Time that it feeds the Corn in the Ear, it keeps down its Rankness in the Stalk, and prevents Weeds.

This may seem strange to the unexperienced Reader: but the practical Husbandman knows there are Soils which do this naturally; and others may be made to do the same by Art. He sees some Lands on which Barley in particular has an Ear almost as long as the Stalk; and he may give the same Virtue to others.

This he is to do by manuring a tolerably warm Soil with rotten Compost, and the best Ingredient in this is Cow or Ox Dung. The Way I have practised it is this. I have made up an Heap, proportioned to the Bigness of the Field, of Horse Dung, Cow Dung, and River Mud; laying them in Layers one over another; a Layer of Horse Dung, then of Mud, then of Cow Dung, then a Layer of Mud, and then of Horse Dung again, and so on. This Heap I cover with fresh cut Turf, and leave it in that Manner to mellow and rot together. When they are thoroughly rotted I mix all well by frequent turning, and then spread it over the Land just before plowing, that it may be cover'd in, and yield all its Richness.

I have met with very few who know the real Value of Cow Dung, and that because its Nature is not thoroughly understood. It has not the sudden Effect that Horse Dung has, because it does not ferment so briskly: and therefore it has been suspected of having much less than it really possesses. What Virtue it has also very freely evaporates, and is lost if it be used without due Care. So that the Method in which I have found it so excellent is, perhaps, the only one whereby its full Virtue can be given to Land.

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## CHAP. XXVIII.

### *Of Sheeps Dung.*

**I** COME now to treat of one of the most valuable Articles in the whole Class of Manures: For the Dung of Sheep is, for many Purposes, better than any other whatsoever. It has not that violent Heat which is in Horse Dung, from the high Feeding of the Creature; but there is a Richness in it that exceeds almost any other.

Sheeps Dung is not to be managed as Horse Dung is, because of the Smallness; but the Farmers have two Ways of using it very familiar, and very advantageous: and these are employ'd according to the different Occasions. The one is folding them upon the Land; the other by saving the Dung, together with the Urine, under a cover'd Fold. The former is the more ready and the more common Method, but the latter is by much the most advantageous; and is what many have laboured very wisely to encourage.

But



But beside the Use that is made of Sheeps Dung these two Ways, a great deal is lost, which might be saved to great Profit. When the Sheep are fed on Downs they drop their Dung about, and it does very little Service to that Soil. The wise Husbandman may have great Quantities of this daily pick'd up, at very little Charge; and he will find it more valuable than ordinary Dung, by many Degrees. This I mention as a Hint to the industrious and prudent, and shall now proceed to the two Methods by which Sheep are made to yield their profitable Manure to most Advantage.

The Method of folding them upon Lands is sufficiently known, and when there is a good Flock, well managed this Way; the Advantage is very great. But here let me advise the Farmer to take Care, that their Dung be not left exposed to the Air and Sun, upon the Surface of the Ground, for that will exhaust its Richness with no Value to the Land. The Dung should be plowed in as soon as possible: for it is, of all Dungs, the most free to lose its Virtue: and I will maintain it, from what I have seen, that such Earth as is plowed up immediately after the Fold, while the Dung is yet fresh, and the Earth is moist with their Urine, will have ten Times the Benefit of that where the Folly and Carelessness of the Farmer leaves it any Time exposed.

The Richness of this Manure depends, in a great Measure, upon the Mixture of the Sheeps Urine with the Dung; and this is evaporated presently by the Sun, if the Earth be not plowed up to mix and bury such Part as is moistened by it: and in hot Seasons the Dung itself will, on a little Exposure to the Sun, be rendered dry, and of very little Value.

The Dungs, in general, suit all Kinds of Soils; but a cold Clay is what receives most Benefit from the Folding of Sheep. When the Dung is saved in the cover'd Fold, of which I shall next treat, the Mixture being what the Farmer pleases, he may, at his Discretion, suit it to all Lands, and there is no Soil whatever whereon it will not be useful.

This Method of the cover'd Fold has been so long proposed, that it is a Wonder it has not come more generally into use. It is familiar, cheap, and easy: It yields a vast Quantity of Manure, which is a great Consideration: and the Farmer, as already observed, suits this to his several Purposes at Pleasure: the Advantage therefore is universal.

The Method of preparing this is delivered by all the old Writers on Husbandry, and 'tis surprising that it is not as universally practised as it is advised, for not one of the new ones but has recited it. Our first Promoters of it learned it from FLANDERS, where it is still practised to the greatest Advantage; nor is there any thing that more accuses the Farmers of our Country in general of Backwardness in Improvements, than their Neglect of this excellent Method.

Mr. BLITH recommends Sand to be used for receiving the Dung and Urine of Sheep in the cover'd Fold; and others have mentioned other particular Kinds of Earth, but any Kind will receive the Enrichment; and therefore the

Numb. VII.

Farmer is to suit that to the Purpose for which he wants it, using Sand, poor Earth, Loam, or whatsoever else will best agree with his Land, according to the Directions already given on that Head.

The Manner of doing it is this. Let a large Sheep House be built of a long square Shape, boarded at the Sides, thatch'd at the Top, and open at one End. Let there be Cribs put all round it, for fothering the Sheep when necessary; and a Crib may be also placed in the Middle. Let the Floor of this Sheep House be cover'd a Foot and a half deep, with a sandy, loamy, or other Earth, according to the Nature of the Land which is to have the Manure, and let the Sheep stand to feed, and lie on it.

At a Week's End let a fresh Quantity of Earth, of the same Kind with the first, be brought in: and the Dung the Sheep have made, cover'd with it: and let this be repeated every Week, each Covering of new Earth being spread to the Depth of three or four Inches. The Sheep will thus lie higher and higher every Week, and all the Earth that thus makes their Bed, or the Floor of the Sheep House, will be mellowed and enriched with their Dung, Urine, and the Fatness and Perspiration of their Bodies; in such Manner that the whole will be one of the richest Manures the Art of the Farmer can possibly procure.

A Part of it may be taken away from Time to Time, as it is wanted, and fresh Earth laid in its Place, so that there will be a continual Supply.

This Method may be used for the folding of Sheep all the Winter, that are folded open on the Lands in Summer: and those Sheep that are kept on the Downs may be housed at Nights all the Year round, in the same Manner. The Quantity of Manure thus made is vastly great; and the Expence almost nothing. And we are to add this farther Consideration, that as sandy Soils are a Manure for those which are clayey, and so of the rest, the Farmer will all the while that he is enriching them with Dung, be breaking or giving them a Body, or altering them in whatever other necessary Way their Kind requires, with the opposite-natured Soil, which is carried on with the Dung; and which will never be so well mixed with those Lands any other Way. A Course of Years manuring the worst Soil in the World, in this Manner, will thoroughly alter its Nature, so that it never can relapse into its original Barrenness again, and the Farmer will be gathering great Crops all the while.

Even the barren Downs may be, in Time, brought to good Land, by the Continuance of such a Practice: and it is no unreasonable Expectation that a late Author forms, of seeing such an Improvement take Place, if the People concern'd can be prevailed with to have these cover'd Folds on their Sheep Walks, and to take the Manure as it rises, for the Improvement of enclosed Pieces of the Land.



## C H A P. XXIX.

*Of Hogs Dung.*

**H**OGS Dung has been condemned by some of the antient Writers; who have been follow'd in their Censure by some among the later; as unfit for Corn Lands: but the very Nature of that Censure will shew the reasonable Husbandman, that the Manure to which it was applied, deserved Praise. The Fault they attributed to Hogs Dung was, that it produced Weeds. We know that whatever forwards the Growth of one Plant, will promote that of another: and it is our Purpose to oppose Reason and Truth, to Prejudice and Error.

The whole Fact is, that Hogs Dung is a very rich Manure. Any good Dressing will forward the Growth of Weeds, if it be laid on in too large a Quantity. Hogs Dung, as it is the Excrement of a Creature that feeds partly on Animal, and partly on Vegetable Food, is, according to the Principles before laid down, richer than that of any Creature can be which feeds on Vegetables only. This Richness was understood by the antient Husbandmen as a Fault. Experience shews, that one Load of Hogs Dung will go as far as two of the best Horse Dung. The antient Farmers who did not know this, laid it on in the same Quantity they did the other, and then condemned it for the Effects of its great Richness, because they had not the right Management.

Any Dung will forward the Growth of Weeds when laid too thick; and they always laid Hog's Dung too thick, because they did not know its Virtue.

The Mixture of Hogs Dung and Urine, as before observ'd, heightens the Virtue of common Dung extreamly: and this is a very good Way of using it; indeed for Corn Lands no Way is better: for it does not mellow so well in the Earth, when laid in a Heap, as Horse Dung does; and it is so rich, there is no spreading it thin enough singly.

But though it cannot be conveniently used alone for Corn Lands, there are other Purposes for which it serves excellently in its entire State: and among these I shall name one by which it is said to prepare Ground for Corn better than any other Method.

Hogs Dung used entire and alone, is excellent on Meadow and Pasture Ground, producing a large, and at the same Time a sweet Blade.

It is also preferable to any other Dung whatever for Trees. It has been observ'd of old, that Pigeons Dung was the best of all others for the Culture of Fig Trees; but I have try'd it with Hogs Dung in a fair Comparison: and I have found that the Pigeons Dung is useful for other Trees as well as the Fig; but that the Hogs Dung is preferable to it both for that, and all other Kinds.

No Dung yields its Virtue so readily as Hogs Dung: but then none loses it so quickly by an improper Management. The Time of laying it on should be carefully regarded; for a gentle

Rain coming on, will entirely wash it into the Ground in a few Hours; and, on the other hand, a dry windy Day will carry away all its Efficacy, and the Land will be no better than if it had been sprinkled with so much Chaff.

The Farmer who chuses to use Hogs Dung on his Corn Lands, must remember not to spread it in a dry Season; and not to lay on too much. He will do well to make it up with other Matters, and so at once encrease its Quantity, and render it more convenient for Use in the Field. This is to be done in this Manner.

Let the Hogstyes be well paved, that nothing can soak into the Ground, but the Dung and Urine together may mix with whatever is thrown in. Then let all the Refuse of the Garden, Bean Stalks, Pease and Bean Cods, dead Plants, and all other Sorts of waste Matter, be thrown in, and stir'd about from Time to Time, that the Dung and Urine may thoroughly mix with the rest.

The Hogs will be very well pleas'd with this; and it will raise a Quantity of Dung twenty Times as great as naturally would be had from the same Number of Swine. This is to be cleared away and used as there is Occasion, throwing in fresh Matter to be mix'd with the Dung and Urine, and converted into Dung in the same Manner.

I have observ'd that in some Parts of KENT, they have imitated the Custom of close folding Sheep, in the Management of their Hogs. They lay the Bottom of the Stye deep with Chalk; and after that has received the Dung and Urine for some Time, they dig it up and dress their Lands with it to great Benefit; laying in a fresh Pavement to be enrich'd in the same Manner for some succeeding Opportunity.

Earth, Sand, and other Materials, may by the prudent Farmer be in the same Manner laid in at the Bottom of his Styes, and dug out once in ten Days or a Fortnight; and the Styes again supply'd with fresh. This Earth will be vastly enrich'd by the Dung, Urine, and Perspiration of the Creature, and will make an excellent Dressing for Lands. The Quantity also will this Way become very considerable.

In STAFFORDSHIRE they understand the Value of Hogs Dung so well, that they will sow Lands purposely to feed them. There is a particular Kind of Pea they keep for this Service. It is a small white Kind. They sow the poorest Lands with this on Purpose for their Hogs, turning them in to fatten; and letting them lie Day and Night upon it. By this they have a sufficient Advantage from the Swine; and at the same Time the Land is so enrich'd by their Dung, that it will yield a good Grass many Years.

This has perhaps given the Hint to a late Author, who has not set his Name to his Work, for his Proposal of sowing Clover for Hogs. He proposes the keeping a proper Number of Sows that are ready to farrow, in Styes made in the Corners, and along the Hedges of a young Clover Field. They are to be fed with boil'd Turnips at first, and afterwards with raw ones, rais'd for that Purpose, till they have farrow'd, and the Clover is of a Height to feed them.

They



They are then to be turn'd loose, where they will thrive in a surprizing Manner, grazing without rooting up the Ground.

This Practice, the Author says, may be followed upon the same Land for three Years with great Profit; and at the End of that Time the Land will be so enrich'd by their Dung and Urine, that it will yield vast Crops of Corn without any other Dressing. It is strongly recommended, but we cannot say that we have any where seen it try'd, it rests upon the Faith of the Person who propos'd it.

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### C H A P. XXX.

#### *Of Pigeons Dung.*

**I** Come now to a Dung celebrated by all Writers, and valued by all Husbandmen with the greatest Reason. 'Tis a Misfortune that it is not to be had in much larger Quantities. I have observ'd already, that Swines Dung is better for Trees, and from what I have carefully observ'd, I believe that is because the Dung of Pigeons is too hot for that particular Purpose. But this, which is a Fault on that one Occasion, is a great Merit on many others.

This particular Heat which it has in a Degree beyond all other Dungs, makes it superior to them all on cold clayey Soils; on which it promotes the Fullness of the Ear in Barley and Wheat in a surprizing Manner, while the Stalk and Blade of the Corn are not seemingly encreased by it. I have seen a Field on which the Farmer ventured to bestow a large Dressing of Pigeons Dung, where the Barley seem'd half Ear. The Stalk was short, firm and stubby, and the Blades small and trifling, but the Head surprizing in the greatest Degree.

It is a very dear Manure where the Farmer is to buy it; but then as a little goes a great Way, it will bear Carriage better than any other Kind, when the Farmer cannot get his Dressings on the Spot.

The Farmers in HERTFORDSHIRE will give ten pence a Bushel for it by the Waggon Load, and send fifteen or twenty Miles for it into the neighbouring County of BEDFORDSHIRE; and notwithstanding this great Price, it has answer'd extremely well in the End.

Forty Bushels of Pigeon's Dung will be sufficient for an Acre of Land, but there is to be a great deal of Care taken in the laying it on. The best Way is to sprinkle it at top of the Ground immediately after the Barley is sown, for this is the Corn it favours most of all. The first Rains in this Case wash it entirely into the Ground; and the Corn as it swells and softens for shooting, takes it up almost wholly, and has the Advantage of its Warmth from the beginning.

Sprinkled in the same Manner upon the Land just after the sowing of Wheat, it has also an excellent Effect. They call this Manner of spreading, sowing of the Dung; it is to be harrow'd in with the Seed, and its Effect begins immediately with the Shoot. It continues visi-

bly during the whole Growth, to Ripeness; for no Corn swells in the Ear like that which has had a bad Dressing of Pigeons Dung. But this is all. Its whole Virtue is exhausted by one Crop, so that in this Respect it falls much short of Horse Dung, and the common Composts, which enrich the Earth very well for three.

Pigeon's Dung is excellent on moist as well as tough Soils. The Farmer depends on the Effect of its Warmth, which answers equally on these two Occasions; but it is more frequently used on the black Clays than any other Land.

When temper'd with other Dung, it is excellent for Trees: and alone it is superior to all other Manures for a Hop Ground. It enlarges the Hop upon the Plant just in the same Manner as it does the Ear upon the Corn, and gives it a particular Strength and Spirit.

To close this Chapter I shall make two Observations. The one is, That as the Value of Pigeons Dung is so very great, it is extremely adviseable for a Farmer to have a Pigeon-house wherever it can be done with Convenience: the other, that I have found by Experience, Pigeons Dung may be encreased in Quantity in the same Manner as some other Kinds, without impairing its Virtue, provided it be done with Prudence and Moderation.

The Method I have follow'd is this. I have cover'd the Bottom of my Pigeon-house three or four Inches with a fine mellow black Mould well ground to Powder; and this when it has been taken out, mix'd with the Dung and other Matters from the Pigeons, and the Sweepings of the Walls, has been a Manure of prodigious Virtue.

There are many Reasons for the Farmer's having his Dovecoat where he can with any Convenience, as will be mention'd in its Place; but this of their Dung especially, when rightly manag'd, and made the most of, is not the least considerable.

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### C H A P. XXXI.

#### *Of the Dung of Poultry.*

**U** N D E R this Head I shall consider the Dung of Hens, Turkeys, Geese, and whatever other Fowls the Farmer keeps about his Yard. If we were to give heed to all the idle Traditions on this Head, each of these Kinds of Dung would demand a particular Chapter, for they are said to be of perfectly different Natures: that of the Goose being a Poison to Grass, and the Dung of the Peacock burning up Corn.

A better System however is at this Time established: Experience has given the Lye to Tradition, in these and several like Articles; and we find by Trial, that the Dung of all these Kinds of Poultry is very nearly the same, and all very rich.

I have propos'd mixing Pigeons Dung with Earth in a small Quantity, and I shall for a double Reason recommend the same Practice with that of Poultry in general; and particularly with



with Hens Dung. In the first Place this is as rich, or nearly so, as the Pigeons, and therefore it will bear a small Mixture of Earth as well. Then it is in its Nature so tough and clammy, that it cannot be spread alone upon the Land so regularly as the Pigeons Dung is.

My Custom has therefore been, to have the Dung of my Hens stir'd up with about an equal Quantity of fine rich Mould, which divides and breaks it so well, that it will freely spread like the other, in the Way of sprinkling or sowing.

I must farther add, that I think, from what I have seen, it gives its Virtue better this Way than when used alone. For the little Quantity of Earth that is mix'd with it, being already in a Condition of fermenting, spreads the Effect very freely through the Land; and ferments the whole, when harrowed in, not only more speedily, but more perfectly than when it is used alone.

This is the best and most profitable Use of Hens Dung, and when thus sown, as they call it, upon Corn Lands, just after the sowing of the Corn, it perfectly well answers the Purpose of Pigeons Dung, where that cannot be had.

I have known Farmers who, to break the Clamminess of Hens Dung, mix'd it with Pit Sand, or with Ashes, and then spread it on the Land. This is a Practice recommended in Books; but the mixing it with Mould is much better: for it ferments with the Mould, which I never found it would do with the Ashes at all, and very little with the Sand.

Hens Dung, properly manag'd, is excellent for Pasture and Meadow Grounds, as well as Corn Lands. I am for the Method of breaking its Clamminess with Earth, and sprinkling it by way of sowing, on this Occasion also; but the Earth I have always used, on this Occasion, is a particular Kind.

I take the Opportunity of the Bottom of some old Hay-stack for this Purpose; the Soil is always mellowed by being so long cover'd with the Hay, and a great Quantity of the Seeds are sure to be mix'd among it. This is the Earth I use for mixing with Hens Dung for Pasture Ground, and I give it in a double Quantity.

This Mixture spread properly in Spring upon the Grounds, makes them yield a Growth beyond any thing else whatever. I have observed before, that these Bottoms of Hay-stacks are of great Value for this Purpose: but they are not to be compared to this Mixture with Hens Dung, when used any other Way.

Hens Dung, when used on Corn Lands, does most good of all upon a cold clayey Soil: but it may be used on any.

Bad Consequences have sometimes arisen from the Use of it, when that has been done without Consideration; and hence it has fallen, in some Places, into Disrepute: but every thing that can do good, may, in a foolish Hand, do harm. Thus some ignorant Farmer, taking the Dung from his Hen-house, and scattering it irregularly on a burning Soil, parched up his Crop; but if he had first mixed it with Earth, and then bestowed it regularly; there is no Soil on which it would not have done Service, though more on some than on others.

Hens Dung is not only excellent on Corn and

Pasture Grounds, but for Trees. We frequently see those Trees on which they roost exceed all the others of the same Kind and Standing, in the Strength and Bigness of their Shoots: and Mr. WORLIDGE gives an Account, from his own Knowledge, of a Quince-tree on which the Hens roosted, which, from the Virtue of their Dung drop'd near the Roots, and wash'd in by the Rains, bore always an incredible Quantity of Fruit.

Peacocks and Turkeys Dung is exactly of the same Nature and Virtue with Hens Dung. These several Kinds should be all gathered up together and mixed with Mould, as I have already mentioned, and they will make a Quantity much greater than might be supposed, till try'd; and will be of great Value.

The Dung of Geese, Ducks, and all other Water Fowls, differs in some Degree from that of the Land Kinds already mentioned. The Dung of Ducks is particularly rich, but neither that nor the Gooses are so hot as the Pigeons. I speak from my own often-repeated Experience.

The Dung of Poultry is not so much minded by the Farmers, as it ought to be. And that of Geese is vulgarly supposed to be a Cause of Barrenness, but on the contrary, it is rich in the highest Degree. It is excellent on Corn Lands, and may be laid on any Soil.

As it is difficult to spread it thin enough it may be mix'd like the others with Mould, with which it will ferment gently, and mellow in a surprising Manner. After this it will be all wash'd into the Earth, Mould and all, and will stir up a general soft Ferment, which breaks the Soil excellently.

I have examined very strictly, and I think all the Effects of Dung may be referred, as before observed, to the double Effect of its Fermentation; in dividing and in heating the Ground: and what I have here to add is, that the violent and hasty Fermentations that are occasioned by the Dung of these Fowls used alone, and other such Materials, soon goes off; and the Earth which was made hollow by it falls close again, before the Crop is half grown; whereas, when they are thus mix'd with Earth, and the Fermentation comes on more gradually, it lasts the longer. I have been led to name this Opinion by what I have seen in the Effect of Goose Dung mix'd with Mould; and I am confident that the Warmth and Hollowiness of the Ground, occasioned by this Manure, has lasted in a Barley Field from the Time it was lain on, which is just after the sowing, to the very ripening of the Corn in the Ear.

One Caution, however, let me give the Farmer on this Occasion, with respect to his rolling, which will hold good universally: that is, that he never roll the Ground in wet Weather, for it cakes and clods the Soil, as I have seen, and it has prevented the whole Effect of a Goose Dung Dressing, which was never able to recover the Land to Hollowiness after such Usage.

Rolling in dry Weather, on the contrary, at the same Time that it smooths the Ground, flattening the several small Clods, bursts and breaks them: and it is now sufficiently known, that  
breaking



breaking the Soil is of vast Use in giving Fertility. Even the best Dung, with too little plowing and other Tillage, will answer very little Purpose; and the worst in the World, with a great deal of turning, will produce Crops not despicable, from the repeated Tillage without Manure.

One Thing more let me add, with regard to Goose Dung, before I close this Chapter. The greatest Difficulty attending it, is the getting it together conveniently, and spreading it on the Land. Now I would propose to some bold Farmer, to take the same Method with his Geese as with his Sheep, folding them, if I may so express myself, upon the Land.

To explain this exactly and practically, let him turn in his Geese upon his Wheat Field in Winter, and suffer them to lie upon it till they have eaten it off close to the Ground, which they will readily enough do, being fond of the young Blade. They will leave in return their Dung very plentifully, and well enough spread upon the Land, the Frosts and Rains will sufficiently break and wash it in; and his Wheat will rise, in Spring, not at all the worse for the Cropping, and the Earth will be so enriched by that excellent Manure, that the Crop must feel the Advantage.

I have never try'd this, or known it try'd. It is proposed therefore, only as an Experiment worth trying, because the Hope of Success from it is founded on Reason. There are also in Books many Accounts of accidental Advantages obtain'd from the same Cause, which are sufficient to lead a considerate Person to the Attempt.

The old Notion that Goose Dung was destructive to Grass, has been found, by Experience, to be utterly false and groundless. On the contrary, it is seen where ever Goose Dung is drop'd in a tolerable Quantity, on a Pasture Ground that has any natural Heart, the Grass rises finer, richer, and sweeter than it does from the Use of any Manure whatsoever.

This is Experience, and it is vain to oppose against it the idle Tales of old Tradition. Of this the Farmer may be assured, that Goose Dung is as good for Pasture as for Corn Lands; and that if he have Convenience of dressing them with this Dung, mix'd with the Bottom of an old Hay-stack, as before-mentioned of the other, there is no Manure in the World that will yield him a fairer or fuller Crop.

We learn indeed from Experience in other Countries, as well as our own, where the vast Numbers of Water Fowl come in the breeding Time, that their Dung is so far from hurting Grass, or from making it injurious to the Cattle that feed on it, as has been idly imagin'd, that nothing produces so rich, or so wholesome Pasturage.

Upon the Coast of Norway there are several little Islands, where these Water Fowl settle in such vast Flocks, at the breeding Time, that the very Surface of the Ground is cover'd with them. Their Eggs, and their Feathers, are a Merchandize for the People of the Neighbourhood; but this is not all they get by their Visits. As soon as they are gone, the Earth that had been cover'd with their Dung begins to shoot up a Sward, that is not equal'd any where in the World; and they send in Cattle to feed upon it, which though

Carriage when put there, are, in a very little Time, fatten'd to Astonishment.

Some of the Scotch Islands are yearly visited in the same Manner, by the vast Flocks of these Birds that come, from none knows whither, to breed there; and the same Effect follows, where there is any Depth of Soil. But we are not so ready to take Advantage of the Benefits of Nature as our Neighbours; however, on some of the like Places in LANCASHIRE, they have the Discretion to feed Cattle upon these Spots, after they are cover'd with this rich Sward from the Dung of the Fowl; and they find so much Profit from it, that 'tis a Wonder the Practice does not extend every where.



## CHAP. XXXII.

### Of Human Excrement.

THERE is something disgusting in the Thought of using the Excrements of our own Species for the Dressing of Lands, as it is putting them again down our Mouths: but this particular Kind of Dung, is not without its Efficacy; nor must we close an Account of Manures of this Kind, without saying something of it. There will be no Harm in the Farmers understanding its Nature, as to the using or not using it, that must depend upon his Choice.

It has been observed already, that the Excrements of all Animals are rich, consider'd as Manure, according to the Nature of their Food. The higher fed upon the vegetable Kinds, the better; and that the Dung of Flesh-eating Animals is richest of all.

Upon this Account the Excrements of our own Species must needs be very rich, as our Food is, in great Part, of the Animal Kind: there is also another Reason, which is, our drinking fermented Liquors, which never fail to have their Effect afterwards in the fermenting whatsoever they chance to be mix'd among.

The Dung and Urine of all Animals is best mix'd together for Manure, and the Spirit that is in the human Urine is well known to the Curious. Chymists make a Liquor from it that is as sharp as Spirit of Hartshorn.

The famous burning Substance which they call Phosphorus, is also made from human Urine; and the Practice of those who have succeeded best in the making it, shews that the Addition of Excrement to the Urine helps the Effect.

I have named thus much to shew what vast Spirit and Warmth there is in the human Dung. As to its Use, as there is something so distasteful, not to say shocking, in the Thought, and as we have every where Manures enough, of one Kind or other, without it, 'tis more decent and better to let it alone. However, it has been and is used in some Parts of ENGLAND; and in many Places Abroad oftener than is thought.

This is a Practice every where carry'd on clandestinely, for nobody would care to buy that Farmer's Corn, who should be known to use it: but there are those in several of our Southern Counties, who, if they thought proper to tell Tales, could say a great deal of the Profits rising from it.



In FLANDERS it is regularly fold ; and professedly and avowedly laid on Corn Lands ; and 'tis well known that they use it freely in the Vineyards of LANGUEDOC ; where it has been employ'd with us, and the Use of it known, the Advantage has been known also. The Custom, wherever it is us'd to this Purpose, is to spread it, for a Time, upon a Bed of Mould, and let it be exposed to the Sun ; after this it loses a great deal of the ill Smell, and of its hot Quality ; and is mixed with a larger Quantity of Mould, and then spread on the Land.

People are cautious of talking of this ; but so far as can be collected that is the Practice. Perhaps if it were let into the common Mixture of the Dung Compost, it might add to its Virtue : but 'tis not needful there, nor finally with us, on any Occasion whatsoever.

The Writers on Husbandry advise the Farmer who shall chuse to employ this Manure, to mix Straw with it in the Manner of Litter : but those who have try'd this declare, that it does not succeed as is pretended. The Fermentation rising from the Mixture of Straw, with the Dung of the Horse, is very sudden and very great, but the same does not follow on mixing it with the human Excrement.

Upon the whole, though a rich Manure, it is a filthy one, and is the least manageable of any whatsoever, and, of all others, the most offensive to the Servants employ'd in spreading it, as well as to the Thoughts of those who are to feed upon the Corn that rises from its Richness.

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### C H A P. XXXIII.

#### *Of Urine.*

URINE has naturally been named in the last, and some other preceeding Chapters, together with the several Kinds of Dung ; with which it is always mix'd by the prudent Farmer ; and which it assists greatly in its Office. However, it may be proper, at the End, to mention its Effects singly ; and the more, because they may very naturally, and are very generally misunderstood.

The Urine of our own Species, as well as of Cattle, is seen to turn any Plant brown upon which it frequently falls ; and finally to kill it. And from this there grew an early Prejudice against it, as an Enemy to the Growth of Plants of all Kinds ; and some of the antient Husbandmen were, for that Reason, as careful to keep it out of their Dung, as we are to get it mix'd with it at present.

But this should have been considered, that many Things which, in their natural State, or being used alone, are destructive of Plants, yet, in a proper Management, promote their Growth in the greatest and most obvious Manner.

Lime alone is not a Soil for Plants, nay it may be made to kill any. Yet nothing gives Fertility to many Kinds of Soil equally with Lime, when properly applied, as has been hinted already, and will be shewn more at large hereafter.

In the same Manner Salt prevents the Growth of Vegetables, if spread thick over the Ground ;

and will kill them as certainly as Urine, if laid about their Roots, or sprinkled over them frequently in a strong Brine. The Effect it takes is just the same with that of Urine, making the Leaves turn brown and fall off, and, at last, the whole Plant to perish. Yet we find Salt, properly used, is a great Promoter of the Growth of Plants ; and exactly the same is the Case with Urine. These Things are too violent in their natural and naked Condition, but, when properly soft'n'd by Mixtures, they are excellent.

Urine has also another Advantage over many of the other hot Manures, which is, that it is of itself, capable of Fermentation : and by this Means becomes quite a different Thing. The Use of fermented Urine is not enough known in ENGLAND. In HOLLAND they have found it ; and they know it to be one of the richest Manures in the World. They are always very careful of the Urine of their Cattle, which they sometimes let run among the Dung, to assist its Fermentation, and sometimes use singly.

Even Urine, in its natural Condition, is not so fatal to Plants as is commonly imagin'd. If it be repeatedly thrown upon them, it will, doubtless, kill them ; but Experience shews, that after it has made them brown or yellow, if no more be thrown on, they will not only recover, but grow much finer than before.

Dung will destroy Plants, as well as Urine, if it be pil'd up about them in the Time of its Fermentation ; and it will hurt the Growth on many Soils, if laid on in too great Quantity : and Urine, like Dung, will promote their Growth, when it is used with Discretion and Moderation.

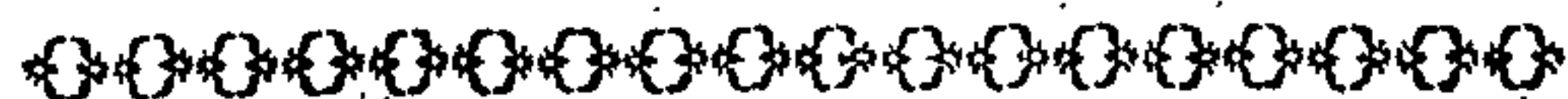
It is better for Corn Land than Pasture : as to its Use in the manuring Soils for Trees, 'tis at present unknown, but there was a Time in which People were acquainted with it ; and they assure us it is excellent for this Purpose. The antient Writers in Latin, upon Country Affairs, advise the frequent Use of it ; and they direct that it should be old, or long kept Urine, so that it is plain they very well knew the Difference between fresh Urine, and such as had been fermented.

An Instance which has been mentioned already of a Person procuring a vast Crop, by dressing the Ground with Woollen Rags soaked in Urine, is a Proof, at least, that Urine, in a discreet and moderate Use, is no Enemy to Vegetation : but in the Eye of Reason it declares yet more in its Favour : for, probably, the Effect was as much at least owing to the Urine as the Rags.

There has been also another Particular mentioned, of the Use of the Cleansings of Roads where Horses stale. This, more than any thing, confirms the Truth of what has been said here concerning it : for it appears, that when these Cleansings were quite wet, and the Urine of the Horses among them was fresh, rank, and in great Abundance, it did Mischief : but, on the contrary, when that Matter was dry'd, and the fiery Parts of the Urine were evaporated, though its Salts remained, as was plain to the Taste, it prov'd of excellent Service, and occasioned a very happy Growth.

C H A P.





## C H A P. XXXIV.

*Of Rags.*

**T**HINGS that serve to no other Purposes whatsoever, generally are useful to the Farmer as Manure. We have an Instance of this in Rags, which when too bad for the Service of Paper-making, usually fall to the Share of the Farmer. And he has his Advantage even in their Faults on the other Accounts; for the nastier they are, that is, the dirtier and the more rotten, the better they serve him for enriching his Land.

The Reason of this is very plain, for their Nastiness arises from the Perspiration of the Bodies of those who have worn them; and all Animal Matters are good as Manure. In the other Respect, the rottener they are, the more readily they dissolve with the Weather, and are wash'd into the Ground.

The Original Reason why Linnen Rags should be useful, is, in the Nature of their Composition; they are made of Vegetable Matter, and it has been shewn already, that all Vegetable Matter when it comes to decay, assists in the Growth of other Vegetables, enriching the Land for that Purpose. Now Vegetable Matter can never be in a more perfect State of Decay than when it is rotting from Rags; unless we should name old Paper, which has been made of Rags, and which would doubtless prove an excellent Manure if it could be had in sufficient Quantity.

Linnen Rags got into use upon this Principle; and they were found to answer beyond all Expectation, which was owing to the before mention'd Addition, their Nastiness; which being owing to the Sweat of the Persons who wore them, could not but enrich the Ground greatly.

These dirty and rotten Linnen Rags were what came first into the Hands of the Farmer, and are what he still gets; for the cleaner and better Kind go to the Paper-mills, only the Refuse coming to him. This in general consists of such as have been worn by the poorest and miserablest People, and consequently have been as fully as possible impregnated from their Bodies.

This is a disgusting Matter to consider as a Manure; that is, as a Substance which is to furnish the Corn we are to eat: but the Farmer finds his Account in it. It is indeed more distasteful, if rightly understood, than the Use of human Excrements. Whoever shall pass by those Cellars in which Rags are sorted for the Use of the Farmers, will perceive a Smell from their Doors worse than that of Bog-houses by many Degrees: it is indeed so horrible, that the Wonder is, it does not breed a Pestilence. But this is all a Proof of the Fruitfulness of the Materials; for all this Smell arises from the same Cause that will raise a Ferment in the Soil; and as to the Stench itself, it is either lost in the Air, or left behind by the fine Vessels of the Plant; never getting into the Corn. This is certain, for HERTFORDSHIRE is the County

where these filthy Things are most us'd as Manure, and no Corn is sweeter than theirs.

After Linnen Rags had been famous many Years, Woollen began to be thought of; and they are at this Time used in some Places, but not universally. Of their Effect when steep'd in Urine, I have spoken already; but without it they are very rich. Nor is this at all wonderful: for as the Linnen Rags enrich Land as they are of Vegetable Origin, these Woollen ones do it as they belong'd originally to an Animal Body, such Things being known to be richer than Vegetables, on this Occasion.

In those Places where they have got into the Use of Woollen Rags, they buy the Refuse of Taylor's Cuttings; and they find them answer very well: but the proper Woollen Rags for the Farmer's Use must be those to be bought of the Ragmen in LONDON; and this, for the Reasons given already about Linnen Rags, which hold true more largely here; because they are rotten, and because they are full of Animal Matter from the Perspiration of those People who have worn them.

I doubt not but Woollen Rags of this Sort, will be found upon Trial, a richer Manure than any Thing of the Kind: and they may be had cheap enough, being of less Use in any other Respect than the others; and for that Reason pick'd from them.

Rags are of the Nature of those rich Manures that suit all Soils, but those on which they are found most beneficial, are the chalky and clayey. They warm, loosen, and enrich beyond most Things, and none shew more speedy Effects. LONDON is the great Market for them; but the Farmers in the neighbouring Counties often send for them thirty or forty Miles, and find good Account in the Expence.

The Way to use them is the same which they take with Pigeon's Dung, and some other of the rich and light Dressings. They are to be chop'd very small, and sprinkled evenly over the Land just after the sowing of the Corn, so that they may give their Virtue to it from the very first shooting.

About five and twenty Bushel is the Quantity for an Acre.

In the same Manner that they use Rags in some Places, the Farmers in others use old Rope, untwisting and chopping it fine, and then sprinkling it over the Land. This is serviceable as it is the decay'd State of some Vegetable Matter; but it is inferior to Rags, because of the Virtue they have got in the wearing. It is reasonable to suppose this should be the Case, and it is found so in Practice.

In some Parts of BUCKINGHAMSHIRE, and the neighbouring Counties, they use Linnen and Woollen Rags on their binding Soils in a larger Way; not laying them on as a top Dressing, but plowing them in as common Manure. In this Case they chop them, but not so small as for the other Use, and sprinkle them by hand evenly over the Ground, allowing a much larger Quantity than the other Way: they plow them in about Midsummer, and leave them to enrich the Land against the Time of sowing Wheat.



Mr. ELLIS says, they have of late got this Practice also into HERTFORDSHIRE, where they use it on Chalk and chalky Loams, allowing five hundred Weight of the Rags to an Acre. This is a more lasting Advantage to the Lands; for the other only serves the single Crop over which it is sown.

The Use of Woollen Rags seems to have begun in OXFORDSHIRE, where at this Time it is more general than any where else in the Kingdom. The Farmers here buy at a set Price the

Refuse of the Taylors for this Purpose, and it has been a Traffick in the Days of their Ancestors, so far back as they have any Tradition. The Effects are plain enough, altho' not using the best Kind of Rags, they have them not in the greatest Degree: and it is astonishing, that a Manure so well known, and so beneficial in one County, should not Ages ago have spread itself from thence alone through every Part of the Kingdom.

## BOOK II. PART II.

### Of ARTIFICIAL MANURES.

#### CHAP. XXXV.

##### *Of Lime.*

*Its various Materials, and the Manner of making it.*

THE employing Lime in Husbandry, has been one of the great Articles of modern Improvement in that Science: and it is now so well understood, that there is Reason to believe, the Use of it will soon be universal. As there is a great deal of Difference between one Kind of Lime and another; and many Niceties to be observ'd in the Use of it, nothing can be more needful than a regular Account of its Nature and Effects. Lime is one of those Things that are able to do great Good; and in Consequence it is capable also of doing a great deal of Harm in the Hands of the unskilful. It would be well that every Farmer in ENGLAND were acquainted with the Virtue of Lime; but it is necessary at the same Time that he perfectly understand how it is to be used.

In the first Place, Lime is of several Kinds, for it may be made from a great many different Materials; and it partakes of their several Natures.

Lime may be made of Lime-stone, Marble, Chalk, Sea Shells, and many other Things; but the two principal Kinds are those made of Lime-stone and Chalk. These differ very much in their Nature; but we cannot say properly that either is best; for they severally are fittest for different Kinds of Lands: the true Knowledge the Farmer should have of these Kinds is, to what Purpose each is suited.

I would advise every Husbandman to burn his own Lime; and for that Purpose shall give him some very easy Rules for the Choice of his Materials. In some Places he may find both Lime-stone and Chalk upon his Ground: he should then make both Kinds; but if only one Sort of Materials can be had, he must make amends for that Defect, by a more careful Study of the Way to use it.

Chalk every one knows at Sight: of this I shall only say, that the hardest makes the best Lime; and this is for the Farmer's Advantage; for the soft marly Chalk is fit for his Use in its natural

Condition, and the harder he can make fit by this Practice of burning it.

Lime-stone is much more common than the Farmer may imagine. It is of various Colours, and Degrees of Hardness; but instead of referring him to the Skillful for chusing it for him, I shall give him one easy Method of doing this for himself.

Let him take a small Bottle of Aqua Fortis with him when he goes over his Land to look after Lime-stone, and let him pour a little of it upon every Stone that looks fit for the Purpose: it will hiss and bubble up when it falls on Lime-stone; but it will run off from all others like Water. This the Farmer may depend upon as an infallible Rule, that every Stone which makes Aqua Fortis bubble, is fit for Lime; and no Stone but what does, will ever make Lime freely, or fit for his Use.

Having thus found what Materials his Land affords for this excellent Manure, let him build his Kiln for preparing it. This is best done in a square Hole dug for that Purpose in the Ground, in some waste Place that lies conveniently for the Materials. The Kiln is to be in Shape like a Funnel, wide at Top and narrower all the Way to the Bottom. It must be firmly built, and lin'd on the Inside with a Wall of Lime-stone.

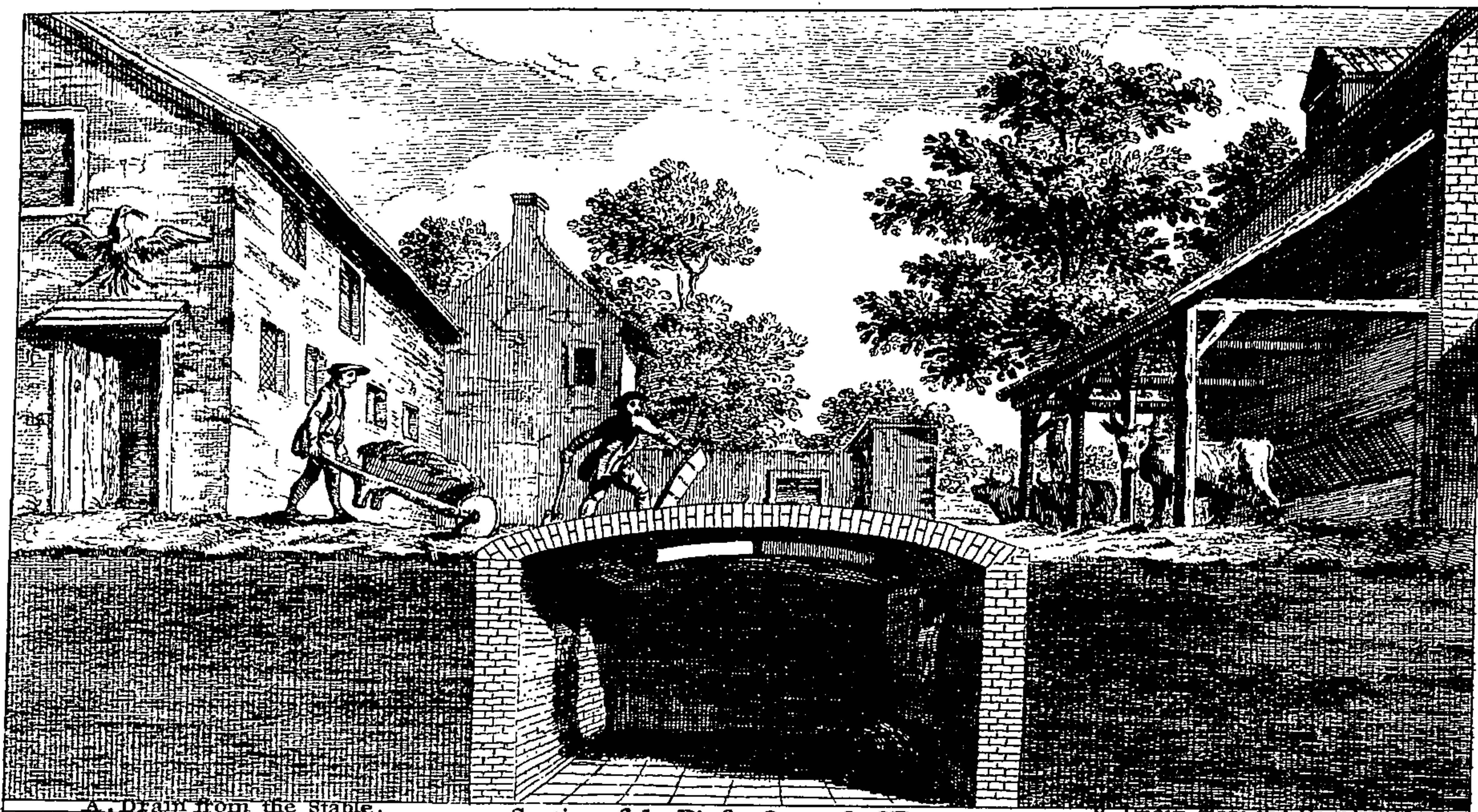
Toward the Bottom of this Kiln there is to be a Hole to let out the Ashes of the Fuel: and above this there must be an Iron Grate on which to lay the first Parcel of the Materials. Some supply the Place of a Grate by an Arch-work of Stone, the same with the Lining of the Kiln, but the Grate is very much the best Method.

When the Kiln is thus prepared, the Farmer is to get together in two Parcels, his Materials for the Lime, whether that be Chalk or Stone; and his Fuel.

This Fuel he may suit to his best Convenience, for almost any Thing that will burn will do. Coals or Wood serve equally well: or very good Lime may be made with Furze Bushes, Peat, or Fern; which last, though so light a Weed, burns with a surprizing Force.

When all is ready, he is to begin by laying a Layer of the Stone or Chalk loosely upon the

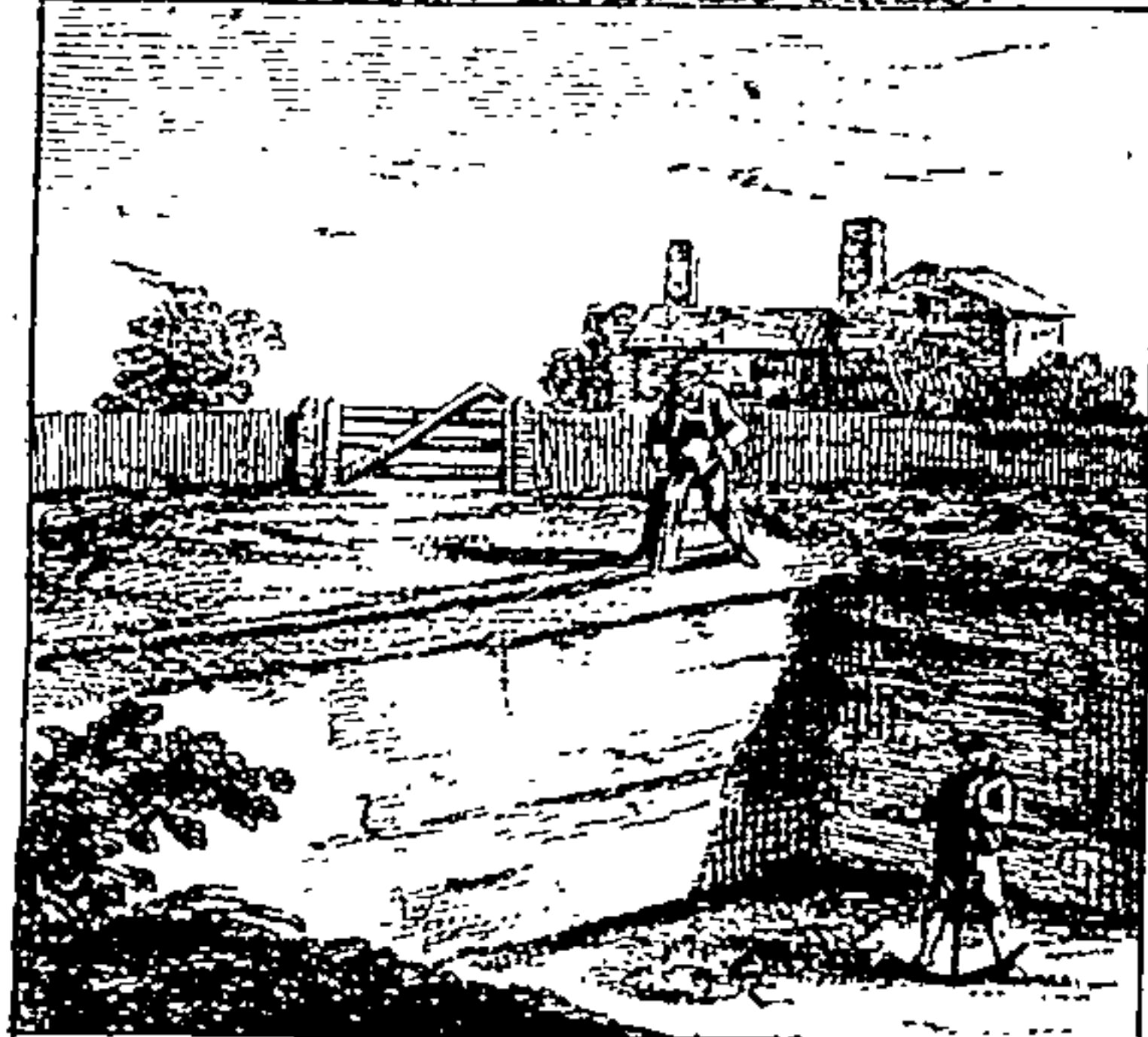




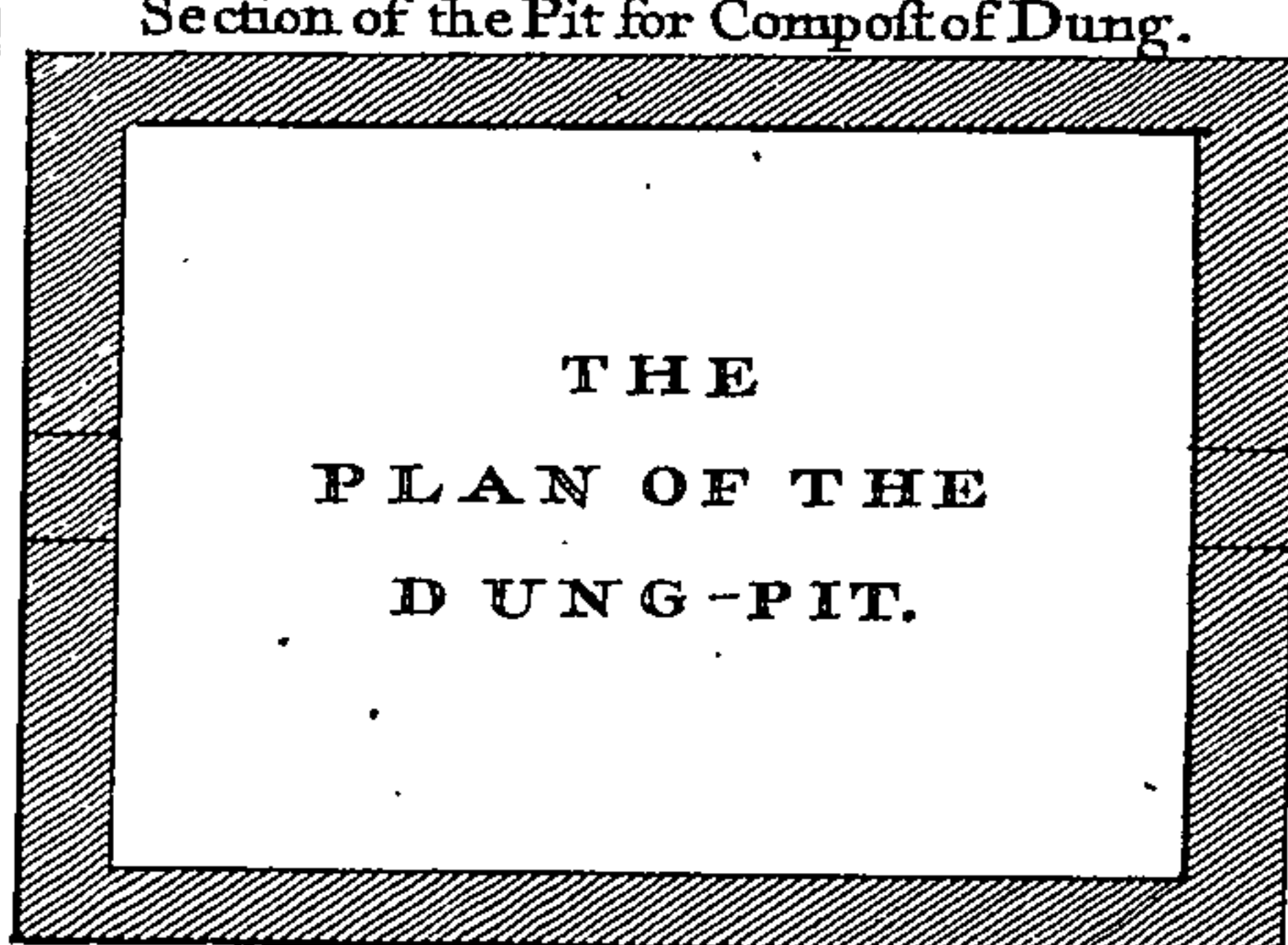
A. Drain from the Stable.

Section of the Pit for Compost of Dung.

B. Drain from the Cow-house.



Putting of Chalk.



Section of a Lime-pit.



W. de la

THE COVER'D FOLD FOR SHEEP.

W. de la

Engraved for the Complot Body of Husbandry: Printing by the King's Authority in Weekly Numbers, at 6<sup>d</sup> each.



Grate, and over that a Layer of Fuel: thus he is to continue putting a Layer of one, and a Layer of another, till the Kiln is quite full, taking care that the uppermost Layer be of the Fuel, not of the Stone or Chalk.

All being thus prepared, Fire is to be given to the Fuel at the Ash-hole, and it is to be left to burn up, and the Lime will be made of itself, without farther Trouble. This is the general Method.

As to the Quantity of Fuel, a Hundred of three Foot Faggots will burn forty Bushel of Chalk. If Sea-coal be used, ten Bushel will stand for the Hundred of Faggots; and the Lime will be made in four and twenty Hours.

Lime-stone, according to its Hardness, takes more Time, and a larger Quantity of Fuel; but, in general, it answers very well to the Expence; being, on most Occasions, very much preferable to the Lime that is made of Chalk.

As to the Quantity of the Lime, Chalk loses about one third of its Bulk in burning; Stone loses also in Proportion; thirty Bushels of Chalk make twenty of good Lime, and so in Proportion, according to the Nature of the Stone.

Where Chippings of Marble can be had, they make the finest and richest Lime for Manure in the World: but these can seldom be in the Farmer's Reach.

In DERBYSHIRE they throw out, among the Refuse of the Lead Mines, a Kind of shining Stone, which they call Spar. It looks somewhat like Crystal, only not so clear: or like large Lumps of Bay Salt. It is whitish or brownish, or of other Colours, and some of it that rises in square Lumps is used for ornamenting of Grottoes. This is an excellent Stone for the making of Lime. They burn it wherever it is to be had, and dress their barrenest Lime-stone Lands with it: they find one Bushel of this Lime as good as two of any other Kind whatsoever.

The softest Kind of Chalks, and some Sorts of Marle, may be also burnt to Lime with great Profit. As to the Marle, one Bushel of it in Lime, is of equal Virtue with five in the common Way: and in the Choice of what Kind to use, the Farmer must have Recourse to his Aqua Fortis, some will ferment and rise in Bubbles with it, and some will not. That which ferments is fit for Lime, and the other is not.

These soft Substances are best burnt with Fern, or other light Firing, and eighteen Hours generally bring them to Lime.

We will now suppose the Farmer in Possession of his Lime; he is to consider next in what Manner, and on what Sorts of Soils, he is to use it.

#### C H A P. XXXVI.

##### *Of the Manner of using Lime as a Manure.*

**L**IME is not one of those universal Manures, which do equally well on all Soils. Its Effects are very great, but they are limited. In general it does well on all light and dry Lands, but does not succeed on heavy and moist Grounds.

All sandy, gravelly, and stony Grounds are  
N<sup>o</sup> 7.

improved in a surprizing Manner by Lime: but Clays get very little good by it. Many of the most barren Tracts of Land in this Kingdom, are of the sandy Kind; and Lime has been used with such Success as an Improver on many of these, that it is surprizing it has not been try'd every where.

There is no saying what Fortunes might be made by enclosing heathy Grounds, and dressing them with Lime; but Husbandry is not yet an universal Science; he who shall make it so will do more Service to his Country than all her Generals and Commanders, since the Time of her becoming a Nation.

Instances might be produced of Lands, at this Time, letting for the full Price of the best in their Neighbourhood, which fourscore Years ago would not bring half a Crown an Acre; and the Beginning of these Improvements has been by Lime, which has alone rais'd Crops upon them at once, as good as those on the most improved Fields.

The common Custom is to use Lime alone, but from what I have seen, I shall venture to affirm, that it takes greater Effects when mix'd with other Matters. This is a Way of using Lime that will turn greatly to the Farmer's Advantage.

There have been those who have sent for Lime many Miles by Waggon Loads, and have found it answer very well: but in this there is a double Disadvantage; not only the Price is greater, but the Lime is certainly the worse. For when Lime is used alone, the best Way is to take it hot from the Kiln, in which Case the Land has all its Virtue. The Part which is lost in keeping, is the best of all. This should always be the Practice upon the most barren and desperate Lands: for others it does very well a little cool'd, and in Mixtures.

The Way of using Lime alone, to the greatest Advantage of all, is by laying it, in a proper Manner, on the Lands sometime before it is intended to plow them up; and this I would advise to be done in the following Manner.

Let the Lime be carried hot from the Kiln, in the Quantity of about an hundred and fifty Bushels to an Acre. Let it be laid in small Heaps, and each of these cover'd with Earth. In this Manner let it remain to receive the Dews and Showers, till thoroughly slak'd: it will then easily mix with the Earth, and may be conveniently spread and plowed in.

This, though it appear a Way of using the Lime alone, really has the Advantage of a Mixture, which incorporates better with the Ground, than it ever would do alone. But in the plainest Way of using it singly, it does more than any other Manure whatsoever.

Stone Lime, sprinkled over a bare Piece of poor, sandy, barren Ground, and left to slake, will render it fruitful without any farther Care or Trouble, nothing need be done but the common Plowings and Sowing, and there will be a Crop: but not so large as if the same had Lime been used with better Management.

Stone Lime is the best for Gravels and stony Soils: Chalk Lime does better on the loose barren Wastes, where there is only Sand and a poor  
Y Earth.



Earth. And on light Soils that have some Heart, or some good Mould among them, the best Kind of all is that made by a slight burning of the softest Chalk, or of the chalkey Marles before described; or that light Kind of Lime which they make in some Places, of broken Chalk wetted and moulded like Bricks.

This is what Experience shews of the suiting the different Limes to different Soils; and the Farmer should attend carefully to it: for by observing it he may reap at least double the Advantage that he could from a random and inconsiderate Use of this Manure.

Nature, in this Respect, is kind to the Farmer, as in many others, if he will but lay hold of the Advantages she offers. Where there is a stony Soil that requires Stone Lime for its Improvement, he will commonly find Lime Stone for the making it, ready at hand.

I now come to speak of the several Mixtures that may be made with Lime, for the using it to most Advantage, and these are three; 1. Dung; 2. Mould or Mud; and 3. Ashes. Of all these Trials have been made, and the Success that has followed, should encourage the prudent and spirited Husbandman to imitate them.

For a very barren sandy Soil, although Lime alone will answer well, yet Experience shews the very best Manure is a Compost of Lime and Cow Dung. The Cow Dung should be double the Quantity of the Lime: it must be mix'd with it hot from the Kiln, and then laid up in Heaps, cover'd with a thin Crust of the Soil par'd from the Surface. Let this be done a Year before the Ground is broken up. But as soon as the Rains and Dews have thoroughly slack'd the Lime, let the Heaps be broken, and after mixing thoroughly the Lime, Dung, and Earth, let the whole be spread as even as possibly over the Land. The Produce upon plowing at a proper Season will be very great, and the Ground will have a more lasting Benefit, than it would have received from Lime alone.

Some have mixed Horse Dung with Lime, and dress'd their light Soils with it; and it has succeeded very well, but Experience shews Cow Dung is better.

For a dry gravelly Soil that is lean or hungry, the best Way of using Lime is, mix'd with fine black Mould or River Mud.

If Mould be used there should be four Times the Quantity of the Lime, if it be Mud three Times as much is sufficient: but let the Farmer always observe, that if he use Mud it must not be fresh from the River, for that would slack the Lime too suddenly; but such as has lain spread out, 'till it is crack'd on the Surface, and tolerably dry. Either Mixture is excellent, giving a lasting Heart to such Land, as well as the Warmth and Spirit for the present Crop.

For a mossy Ground the best Way of using it is with Ashes; and no Ashes are so good for this Purpose, as those of the Land itself. The best Way of doing it is thus.

If the Land be very sedgey, as such Ground often is, set Fire to the dry Stuff on the Surface, and let it take its own Time to burn. This will often burn away two or three Inches of the Soil, sometimes a great deal more, leaving the Ashes

spread very evenly and well. The Lime is then to be sprinkled over these Ashes, about an Hundred Bushels to the Acre, and all plowed in.

If the Surface will not burn, the Turf must be pared off, as will be directed hereafter, under the Head of BURNBAITING; and the Ashes, after the Turf has been burnt, are to be mix'd with Lime, and plowed in as before. In either Case the Mixture of the Lime and Ashes takes an Effect much greater than either could have done alone; and the worst Kind of mossy Land will be thus improved, to such a Degree, that a first Crop shall pay all the Expence of Dressing and Enclosure. Of this there are indisputable Instances upon Record.

With respect to the Time which the Benefit arising from Lime lasts, there is great Difference from the Nature of the Soil, of the Lime itself, and from the Manner of using it. One great Complaint is, that Lime is expensive, and that its Good is not lasting: but this may be remedy'd both Ways, by due Care and Management, added to a Knowledge of the Business.

In the first Place, a great deal of the Expence of Lime may be saved, as the Farmer is now taught to find the Materials, and burn it for himself; and in the next, the Benefit arising to Lands from its Use may be made much more lasting, by the proper Mixtures and Management; and by a proper Care of the Land itself.

The worst managed dressing with Lime of the weakest Kind, such as that made from soft Chalk, will have the same lasting as Dung, that is, it will enrich the Land for three Years. Good Stone Lime well made and well laid in, will very well last Five Years. With Horse Dung its Virtue will hardly hold out quite so long; but with Cow Dung it will afford two good Crops more. But then it must be allowed, that the first Crops from Horse Dung and Lime will be richer.

Lime, with Ashes made by burning the Land, lasts but three Years in its full Effect: but then the Land is not left so impoverished, as it is where the Burnbaiting has been practised on it alone.

The Dressings of Lime and Mould, are the most durable of all: and with a little Refreshment of the Land, at Times, will last ten or twelve Years.

This is what Experience confirms, and the Farmer should regard it accordingly.

*Additions to the Article of Lime, from a Correspondent; containing an Account of making and using it in STAFFORDSHIRE and DERBYSHIRE.*

There are such great Improvements made by Lime of late Years, and such prodigious Quantities now burnt, in comparison of what was within the Memory of many now living, that it may deservedly be called, A general Improvement; and perhaps, if all Things be duly consider'd, it will be found the most useful artificial Improvement in the whole Kingdom; and consequently deserves to be consider'd in a very particular Manner, from the Method of getting it in the Stone Pit, to the Manner of burning it into Lime, and so carried on through the various Ways it may be usefully applied in, as well as the several great Improvements produced



by it when properly applied, to almost all Sorts of Corn Land, and Grass Grounds, both natural and artificial,

But before I enter into these Particulars, it may be proper to observe, that Lime-stone Ground, is generally of a sweet and rich Nature, and the Waters which run from it, very much improve the Lands they flow over; whereas those Waters which come from barren Heaths, and several other Sorts of hard Land, are frequently prejudicial, and do great Damage to the Grounds they flow over.

The Richness of the Dove Bank Lands in STAFFORDSHIRE, which have been esteem'd equal to any in ENGLAND for feeding, is certainly owing to the Waters running from the Lime-stone Hills, and the Sheep Dung they carry along with them; so that they who have proper Opportunities of turning Lime-stone Water over their Grounds, may know how to apply it for their particular Benefit; and also to avoid such Waters as are prejudicial. And the Wash of plowed Fields and rich Meadows are also frequently very advantageous, where they can be properly applied, as well as the Wash of Rivers passing near great Towns.

And indeed Lime-stone itself which has not been burnt, will alter Ground for the better, as is evident from several Places on the Moors, where Loads of Lime-stone having been shot down, and lain there some Time, it has quite alter'd the same from a coarse sour Grass, to that of a kind sweet Sort.

There are two Sorts of Lime-stone commonly to be met with, one a beddy Sort lying almost in Courses, and in some Places almost as even as Bricks, which is generally got pretty easily, especially if Beds of Earth lie mixed with it; of which a Man will then get a great Quantity in a Day, ten or a dozen Ton or more; and this Sort is commonly of a yellowish Cast, and in general makes the whitest Lime; and a solid square Yard is commonly computed a Ton.

The other Sort is usually of a more rocky Nature, and much harder to be got; so that we are often forc'd to blast it with Gun Powder; and if the Rock be very firm, it is scarce to be thought what large Pieces of the Stone will sometimes be blown into the Air, and how a little Powder in an Augur-hole, at about ten or twelve Inches deep, cover'd with Sand, will pierce the most solid Rock, shake it, and open the Joints so that it may be got by Wedges: but if the Rock be jointy, the Blasts will generally have little Effect, as the Powder then finds a Passage through the Joints.

Stone of this Sort is in Reality the same as Peak Marble, and where it will bear polishing, is got and used for that Purpose, and very large Pieces are met with in some Places proper for it.

This Stone is commonly of a bluish Cast, and specifically heavier Foot for Foot than the other Sort, and consequently must turn out more Lime when burnt, and is generally esteemed stronger for Land than the other, though the former is whiter: for which Reason I used to send for the former for the last washing a Room. And here I cannot but observe, That I never

knew or heard that any Workmen, though employ'd for Numbers of Years, and almost constantly both Day and Night, engaged in the Smell and Smoak of a Lime Kiln, were ever any way prejudiced in their Health by it, tho' it is Death to all Vermin about them; and we have frequently Instances of Persons losing the Use of their Limbs, or their Lives, by going too soon into green Houses, or Rooms new shot with Lime, before the Mortar made of this Lime and Sand, has been very well aired, and long seasoned.

In this last mention'd Stone are found that infinite Variety of seeming Shells and Bones, which are visible in the Peak Marble; and, to give any tolerable Account of which, has so much perplexed the Philosophers.

I have several, and have seen Numbers of seeming whole petrified Cockles, Oyfters, and Bones of Fish; and have one which is in Appearance the petrified round Back Bone of a Fish, with fine rising sharp Edges, at equal Distances, not half an Inch Diameter; the whole of about three Inches long, fast at each End in the Piece of the Lime-stone it is in.

There are two Sorts of Sale Lime Kilns used in different Parts of STAFFORDSHIRE and DERBYSHIRE; one of which they fill, and close, or shut up, burn it, and let it cool; and then draw it all out, the Days being appointed for the Farmers to fetch it. These Kilns generally hold thirty or forty Quarters of Lime, being six or eight Waggon Loads; so that Mr. ELLIS must be misinformed about a Load being a Kiln of Lime near DERBY.

And indeed every new lighting a Kiln occasions such Loss and Expence, considering the Quantity of Lime burnt in one, that few like it; for which Reason those called running Kilns, commonly kept in from the Time they are lighted, as long as they have Custom, and often from APRIL to OCTOBER, are generally chose for Sale Kilns; and also by those who burn for their own private Use.

The publick running Sale Kilns are generally about seven Yards deep, and contrived either at the Side of a Hill, or by sinking the Ground, so that the Workmen may have Room at the Bottom under the Cover of the Kiln to draw out the Lime, and also Conveniency to lay some by, and to set some Loads ready for Customers, and the Top of it to be readily come at, to bring the Stone and Coals to burn it with, and to have Room to break the Stone, and fill the Kiln.

The Bottom should be laid with a good Stone dipping toward the Mouth it is drawn at; and at about two Foot high, there is a Stone runs cross the Kiln, called a Horse, for the Lime to fall down on each Side of it, and to prevent the Lime falling down altogether; which Stone ought to be such as will bear the Fire, since if it break, the whole must sometimes be drawn out again not well burnt: and the Stone facing the inner Part should also be of the same Nature, especially toward the Bottom. Sometimes indeed Lime-stones are used also for the Inside near the Top, and will last a Year, and may be easily repaired the following Spring.

The



The Kiln, here, widens gradually from the Bottom to nine or ten Foot high, to about nine Foot wide, for about two thirds of the Height, and then is drawn in again gradually to about six Foot wide, which makes it burn better, save Coal, and is easier closed up at the Night till Morning; so that the Fire gets not up too soon and wastes, when the Stone is commonly heaped up high like a Pyramid.

At first lighting it, towards the Bottom, they use Wood or Gorse (Furze) then half Coal and half Stone, and encrease the Quantity of Stone gradually, till they set on twenty Scuttle full of Coals to sixty of Stone, which is called a Bed, which Stone is about a Ton; and when the Kiln is warm and goes well, one Horse Load of Sless, or Coals, will burn two and an half, three, and sometimes, in good Weather, more Loads of Lime; and a Kiln will draw seventy or eighty Sale Horse Loads a Day, which are generally about three Bushels, even by the Wood, to the Load, or two and an half full up-heap'd Measure: two Bushels which I burnt, of full Measure, was fourteen Stone Weight, and few Sale Carriers will carry more. What is called a Bushel in the South, is called a Strike in those Counties.

The Coals, or Sless, they burn Lime with, are usually an ordinary Sort of Coal, subject to smell and smoak very much, and consequently are little burnt in better Families; the Price of them is about Two-pence per Load, and the Expence of Carriage, according to the Distance from the Lime Kiln, generally about a Penny a Mile in STAFFORDSHIRE.

These running Kilns burn Lime much cheaper, and full as well as those that are only once filled, burnt, and let out again; and have not so much Waste in Proportion; and, I think, few seem to have any just Notion of Lime burning, which makes me say so much on this Subject.

A running Sale Kiln employs four Men; one to get the Stone, one to wheel it to the Kiln, and the other to draw the Lime, fill the Bags, and help to load Horses, and set on Beds of Stone and Coals above, in Proportion to what is drawn below.

The Wheeler has but common Labourer's Wages, the Stone-getter, according to the Nature of the Stone, but the two Burners, who seldom leave the Kiln, except, one Way or other, near double Labourer's Wages, or more, especially as they should be experienced; and are generally tied to it from APRIL or MAY, till OCTOBER, according to the Season and Custom. So that any Person may pretty near compute the general Expence of burning of Lime, great Part of which depends on the Nearness and Cheapness of Coals and Lime-stone.

The building my private Kiln cost me about three Pounds, and it would draw fifty, or near sixty Quarters per Week of up-heap'd Measure; and with very little Repairing has lasted, occasionally, above thirty Years; and I had the Stone got and bedded, and gave a Man and his Boy One Shilling and Six-pence for each ten Quarter they burnt and delivered, but generally let him have some farther Advantages.

The Curious will excuse my mentioning an

Observation, made by several Lime-burners; that all the Art they have, about MAY they cannot keep the Lime from falling to Powder, though they can, for a considerable Time, at all other Seasons; and some of them think the Return of the Heat and Spring has an Influence upon the Stone, as well as upon Plants and Animals.

There is one thing relating to Lime, it may be proper to caution those concerned with it, to be careful about; which is, that they be very cautious how they lay it in Buildings, or near Wood, or any thing combustible, since it is very subject, on Wet coming to it, or even sometimes with the Moisture of the Air or Earth, to fire any thing near it. And on very wet Days Lime has sometimes fired the Sacks on the Horses Back, and the Carriages it is taken in from the Kiln.

The common Price at the Sale Kilns, near Buxton in DERBYSHIRE, and at CALDON GRANGE in STAFFORDSHIRE, is about Five Shillings and Six-pence the Sale Load per Score, and Four-pence per Load to Farmers, who generally carry three up-heap'd Bushels, there called Strikes: and from those two Places, I apprehend, there are full a thousand Loads a Day carried round the Country, besides what private Persons burn for their own Use.

Some of the present Lime Burners, at the public Sale Kilns, now make use of Waggon, like those used to run on wooden Frames, at the Coal Pits in SHROPSHIRE, and at NEWCASTLE; which, going on low wooden Wheels, and on a Frame of Wood, are easily loaded, and drawn from one Place to another; and, when placed over the Boat, forty Hundred of Coals are unloaded into the Boat in an Instant, by opening a Trap Door at the Bottom of the Waggon, and the Coals drop down. And the Lime Burners load Waggon like those with Stone, broken to the proper Size at the Stone Pit, and then draw the Waggon over the Kiln, on a Frame, and then unload it into it by the Trap Door; which saves all the usual filling of Wickets, and then throwing them into the Kiln one by one. And by this Method two Men almost do the Work of four, to the great weekly Advantage of the Owners.

There is one Thing I have frequently observed, that old Stone is neither so easily burnt, or makes such kind Lime as that which is new got, and even lying a few Days when got, exposed to the Air and Weather, is to its Disadvantage in the burning it into Lime, as well as the out Part of the Lime-stone Rock, which has been long exposed to the Wind and Weather. And the same has been commonly observed of several Sorts of Free-stone, that they are much softer and easier worked when new got, than when they have been exposed to, and hardened by, the Air, Sun, and Weather.

There is some Art and Care necessary in breaking the Stone in proper Sizes for the Kiln, and the great Hammers are made with Faces suitable to that Purpose; for a large flat Stone will be burnt well, when a round lumpy one will not, though of much less Size. And the throwing in much small Stone is subject to choke the Fire, nor is it chose but when they lay some round the Edges, to prevent the Fire burning too furiously there.



Before I enter into the general or particular Uses of Lime, there are two or three Things, which, from my own and other Peoples Experience, I would particularly recommend to the Reader.

The first of which is, to Lime the Ground (I speak chiefly here of Grass Ground) as soon in the Year as conveniently may be; for I am satisfied that Lime laid on Ground before MID-SUMMER, is much more beneficial to it, than what is laid on some Time after. And the later it is laid on in the Year, it must consequently be proportionably the worse for it; though the Lime Burners will tell you it is equally good then.

But as to laying it on ploughed Land, the Course of Tillage must be observed; and as to Compositions, or Mixtures of Lime and Dung, and Soil, &c. the Season of the Year is not so much to be regarded.

But in all these Cases I would advise, not to let it lie and mortar (as they call it) before it is used, which is a great Mistake, and very prejudicial, though I have known some old Farmers practise it; but by all Means spread your Lime while it is in the Flour, when it is laid on Grass Ground.

And I think it not adviseable to lay Lime on where there is much Grass on the Ground, which certainly must prevent its having so good an Effect on the Ground, as it will when the Ground is barer; nor will a Farmer be surprized to find, that his Cattle will not touch the new limed Ground, until some Rain has fallen to wash the Lime a little in. After which they will eat of it, and prefer the Grass of the limed Ground to any Quantity of Grass of the unlimed Part of the same Field; but in a long dry Time it would not be prudent to Lime a Pasture all at once, for the Reason above.

The most learned and judicious Persons will not pretend to assign Causes.—“ I confess (says an ingenious Gentleman) that I am ignorant of the Cause of this great Power (of Lime) whose Effects are astonishing, as much as I am of Elasticity or Attraction; though perhaps it is nothing but a Modification of those two conjoined, acting on, and exciting the Fluid of Fire, which pervades, and is contained in every thing.” But however unknown the Cause may be, or whatever Disputes there may have been amongst the Learned, to what Sort of Land it is properly applicable, and to which not; yet all agree, That,

Lime is an excellent Manure, rightly and discreetly applied, though they differ as to its operative Effects, and the Manner of applying it.

But what I am at present concern'd in, is not now to explain the Nature of Lime, or its surprizing Effects, and the Manner of its working; but only to shew how best to preserve that Power, and apply it best to the Ends designed, that is, the Farmer's Benefit; and not let its Virtue be lost, or wasted to no Purpose; which will explain, and in some Measure, justify the Directions above given.

Now it seems very evident, that all the Benefit of Lime must arise from something in the Nature of the Stone itself, or else from the Heat communicated to it in the Lime-Kiln, or from

both, and the Effects they produce in the Earth. And therefore the sooner it is applied the greater Effect it must have; for it is very evident, that it loses of its Heat and Virtue by lying exposed to the Air, and that if wet gets to it, it must cool the Heat of it, and will make it (as they call it) clotted in Lumps, which must not only weaken the Force of the Fire within it, but also prevent the fine Particles of it operating, as they would otherwise do; and will prevent, or at least lessen, that Fermentation which is generally thought to produce that useful Vegetation occasioned by Lime.

And certainly if Lime is laid on the Ground early, and when it is bare, whilst fair warm Weather may reasonably be expected, and spread whilst it is the Flour, it will then enter the Pores of the Earth, and produce the desired Effect there much better than when Rains fall, or cold frosty Nights lessen its Goodness, or when much Grass, or the Dews commonly on it cool the Lime, or absorb the fine Particles of it, or at least prevent its easy entering into the Ground.

It was before mention'd, that the most judicious in their nicest Enquiries, do not pretend to assign Causes; that being in Truth out of the Reach of human Understanding, however vain and presumptuous several are in their Pretences to explain every Thing.

Dr. WALLIS, Mr. DERHAM, and Mr. HALLEY, freely confess it in their most curious Treatises on Philosophical Subjects; and Mr. HALLEY in his Treatise, Of the Effects of Gravity, mentions several pretended Explanations of it, and says, “ This is so far from explaining the Motion, that it is little more than to tell us in other Terms, that heavy Bodies descend because they descend.” And after answering their Arguments, then adds, “ Though the efficient Cause of Gravity be so obscure, yet the final Cause is clear enough; for it is by this single Principle, that the Earth and all the celestial Bodies are kept from Dissolution, which infinite Wisdom ordain'd for their Preservation.”\*

The learned Dr. FREIND, after many Considerations on this Subject, is at last for resolving this, as well as other Things of this Kind, into the Will of God; and adds, “ It appears therefore that the true Method in which Philosophers must proceed in their Investigation of real Science, is

“ First, They must search out the Natures and Forces of Bodies by a Multitude of Experiments; then neglecting to enquire into the Causes from whence they proceed, they should pursue and explain the Phenomena that result from the innate Virtue of every one.”

To apply what is before mention'd to the not being able to assign the Causes of Things, to this our present Subject of Lime; it appears hence very plain, that it would be of no Use to pretend to explain the real Nature of Lime, or the Manner how it operates on Bodies in respect to altering their Natures, or improving their Vegetation.

That it does so in numerous Instances is evident beyond Dispute; and from the many Experiments

\* *Philos. Transact.*  
vol. 1.  
p. 471.



periments already made, we may naturally conclude, that the same Causes will generally produce the same Effects, and consequently we may justly apply it in the same Manner, and thereby reasonably hope to obtain the same profitable End.

And thus by duly considering the Strength of our Lime, the Nature of the several Soils, the different Grass Grounds, the various Plow Grounds, the very different artificial Grasses, Plants and Herbs, to which we may, or intend to apply Lime; we may learn to proportion it to them respectively in such Manner, and in those suitable Seasons, as may best tend to their several Improvements to our great Advantage: and also thereby learn to avoid every Thing prejudicial or fatal, which the over-liming Lands, or liming them improperly, might occasion.

To give an Instance from Mr. ELLIS, as to the Strength of Lime. He concludes that Lime agrees best of all with the cold wet Clays, because his Neighbour with the limy Rubbish of his Kiln, dresses his high Clay Grounds that annually returns him vast Crops.†

† Vol. 8.  
p. 392—5.

Now if I understand Mr. ELLIS right, what he calls limy Rubbish at the Sale Kilns, is called Lime Ash, and is of so little value, that Mountains of it are thrown by, it not being thought worth the Carriage to any Distance, as being a Mixture of small Lime, Refuse of the Coals, and accidental Rubbish; and a Cart Load of it is not thought of equal Value for the Ground as one Horse Load of good Lime; and accordingly it is laid as thick on the Ground as common Dung.

So that this limy Rubbish partaking much of the Nature of Ashes, can be no good Argument for Lime being best for cold wet Clays, which it certainly is not; though this Rubbish might improve his Neighbours wet Ground, and such will be of Service to Land of this Sort when laid on in great Quantities; and if Chalk was burnt by Mr. ELLIS's Neighbour, it will be stronger against Mr. ELLIS, as that is not equal to Lime-stone in Strength and Goodness.

Again, Lime is found very beneficial to dry Lime-stone ground, where there is a tolerable Depth of Earth, but should you lay a great Quantity of it where the Soil is very shallow, you would not only lose the Expence of the Lime, but prejudice the Ground that it is laid on.

No experienced Farmer would expect any useful Produce from Lime laid on an entire Clay, or on an Heap of bare dry Sand, without what we call Earth or Loam, or some mix'd Soil over it: and there are some Lands very near such bare Clay and Sand, to be met with in several Places, and to lay Lime directly on either of them, would certainly be both Labour and Expence in vain.

Too large a Quantity of Lime also will be hurtful, and this is the Case in all Manures whatsoever, both natural and artificial. For if you lay on too great a Quantity of any of them, instead of improving your Land, you will certainly spoil the present Produce of it, and some times for Years; till different Husbandry, or the repeated Operation of the Sun, Air, and

Weather, have brought the Land again to a proper Temperament, fit for the Growth of the Vegetables expected from it.

Instances of great Faults of this Kind in Dungs are not very common, and where they are committed, the Land will generally soon recover of itself.

But there are other Instances in Marle, and particularly of Salt Water, frequently to be met with; where, if too much of the former be laid on, or too much of the latter lie long on, or come too frequently over the Ground, such Land will not be of any tolerable Goodness for many Years; and in some of these Instances never, until the Cause be removed, or a Remedy applied.

There have been several Instances of over-marling Land in CHESHIRE, by which the Ground has been quite spoiled for many Years; which yet after the Sun, Air, &c. have reduced it to a proper Temperament, has been very fruitful for many Years after.

And as to such-like Effects of Salt, though that is certainly a wonderful advantageous Improvement, when properly applied; yet there are numerous Instances where the Salt Water accidentally lying too long on, has spoiled the Ground for a Year or two, which nevertheless were very fruitful for many Years after.

This was the Case of several Meadows of a near Relation of mine after the great Storm, as well as of several others.

But what will make this Matter evident beyond all manner of Dispute is, the Case of the Marshes and Lands near the Sea, which if constantly overflow'd every Time, produce very little of any Kind of Value; and the Lands adjoining to the Sea, if too often overflowed (by the Banks being let down) by high Tides. The prejudicial Effects are very visible, for a Stranger may see by the Sort of Grass how far the Sea Water usually or accidentally comes too oft.

But when these Lands are well banked against the Tides, those Meadows soon come to be good, and those very Sea Marshes gradually improve without any manner of Additions, or Husbandry, to very good Pasture Grounds.

The same Effects must be naturally expected, and are accordingly found where Land is over limed; which recovers not, as observed by these Gentlemen, till tendered and altered by the Application of Things of a different Nature, or it be mellowed by Time.

And is not this the Case of every one of the different Improvements above mentioned in general; and also in a Thousand other Instances in particular; in which if too much of one Sort of Manure or Improvement for one Sort of Tree or Vegetable be applied, it hinders its Growth, and perhaps proves fatal: when this very same Quantity of Manure would encrease the Growth and Goodness of other particular Trees and Vegetables, after a very surprizing and wonderful Manner.

On all Ground where any one would offer to lay Lime, there is a Coat of Earth or Loam Soil, though sometimes very thin, not even an Inch and an half, and in others to a very great Depth;



Depth; in both which Lime will be useful, if applied seasonably and in proper Quantities, according to the Depth, the Tendernefs, or stiff Nature of the Soil; and it is the proper proportioning the one to the other, in which the Art of making Lime, and indeed of all other Manures, beneficial confifts.

In feveral Parts of the Moor Lands in STAFFORDSHIRE, where the Ground is generally moift, and the Soil of a tender Sort, and often very fhallow (much of it having been pared off for firing) yet even here, Lime spread on the Surface, without any further Care, sweetens the Ground (and what they call there breaks it) generally in two or three Years, and produces a sweet Kind of Grafs. This will continue good as other Lands, unlefs impoverished by too much plowing, or carrying off the Produce, by which any Land may be prejudiced; but here, if you plow into the Clay, you spoil the Land.

I have limed Land of this Sort from four to nine Inches deep of Soil, laying on forty Bushels, up-heaped, on an Acre; some of which brake and pastured pretty well in two or three Years, whilst other Parts of it were fix or seven Years before it answered well; after which I plowed it up, and had very good Turneps, where I sowed some, and good Crops of Oats on other Parts. And it will now pasture very well, and mow too after, provided it be not plowed above two or three Years, and it would be well then to give it a little Muck.

In moift Lands of this Sort the Lime is fubject to sink deep where the Soil is fo; for which Reason it is oft convenient to plow it before it be gone too far, and the Benefit of it, in some Measure, loft out of the Reach of the Corn and Grafs growing on it.

In the PEAK of DERBYSHIRE a great Quantity of Lime-ftone Ground, with a coarfe Turf, has been improved with only liming it, and then letting it lie for Pasture Ground without any further Trouble or Concern about it, and it answers very well. Some Persons have got good Estates by taking long Leases of Parcels of Commons, when divided, and then liming and fetting them out again.

And here it may not be unufeful to mention what happened to one of my Tenants, who was a very good Houfwife, yet found her Cheefe bad, though made as ufual, the Year after the Ground was limed, which had fo enriched the Milk, that it was neceffary to break the Curd a great deal fmaller than fhe ufually had done, to make her Cheefe then good; which fhe thenceforward obferved, and made exceeding good Cheefe.

These Instances confirm what was before mentioned, that Lime sweetens Land, not fours it, as Mr. SWITZER mentions; nor is it to be taken as one of its good Qualities, to absorb the Wet, as Mr. ELLIS is pleafed to imagine.

But the great Art in relation to Lime, and indeed to all other Improvements, is, how to proportion the Sorts and Quantity of the Manure to the different Soils, and to the Nature of the Things defired to be produced; which, as to Lime, may be pretty eafily collected in common Cafes, from what is before mentioned; and in

any uncommon Cafe, may be readily brought to a Certainty, by a few Trials on fmall Quantities of Land; and in moft Cafes, efpecially in good Land, with fhallow Soil, it is better to repeat, than to lay great Quantities of Lime on at one Time.

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## C H A P. XXXVII.

## Of Soot.

WE come now to the Confideration of another of the artificial Manures, which is alfo the Product of Fire; nor are thefe two all that the Husbandman owes to the fame Principle: Afhes of various Kinds come in a natural Way, from the Effect of Fire upon our common Fuel, at the fame Time that the Soot is formed: and they likewife are very beneficial to the Farmer.

Soot is of two general Kinds, the one, that which arifes from Wood, the other that of Coal. Thefe differ very much in many Refpects, but they are nearly the fame in their Effects and Value to the Farmer. The Wood Soot is folid and fhining, the Coal Soot loofer, and of a deader Colour. The Wood Soot fells in LONDON at a great Price, in comparifon of the other, for the Ufe of Chymifts and Apothecaries, becaufe it is fcarcer, the Fuel of LONDON being, in general, Coal: but in the Country, where this is as common and cheap as the other, the Farmers rather prefer Coal Soot before it.

Those who have written on Husbandry, differ much in the Kind to which they give the Preference. MORTIMER fays Sea-coal Soot is by much the beft, and WORLIDGE tells us, that Soot is a good Manure, efpecially fuch as is made of Wood: thefe are both very honeft and good Writers; but Experience is to be preferred to either. The Truth is, that neither Kind deferves a general Preference, but that Wood Soot is better for fome Soils, and Coal Soot for others. Indeed the latter is beft on the greateft Number of Soils, and therefore the Farmer is right in valuing it the more. However, this Difference is not fo great, that any Danger can arife from a Miftake about it, for fuch Land as will do well with one Kind of Soot, will alfo with another: all that the beft Choice can do, gives only a little Advantage.

As there are Soils which refuse the Affiftance of fome of the moft enriching Manures; there are others of equal Efficacy, which perfectly well agree with them. This is exactly the Cafe in the prefent Instance. Clayey Soils, as we have feen already, will not bear Lime; but Soot is the peculiar and appropriated Manure for thefe; and it will do for them, all that Lime does for the others. But in this the Soot has the Advantage of the Lime, that there is no Soil whatfoever but it fuits.

As to the fuiting the particular Kinds of Soot to the different Soils, the Rule is this. For all clayey, chalky, and moffy Lands, the Coal Soot is beft. And this is the Reason why the Coal Soot is moft in Repute in LONDON for this Traffick, becaufe the HERTFORDSHIRE Farmers,



mers, who buy it almost entirely, have, for the most part, clayey or chalky Soils to cultivate.

For gravelly, sandy, and loamy Soils, the Wood Soot is preferable to that of Coal: and in its Nature indeed this Kind is better and richer than the other, because, being made from a vegetable Substance, it is richer and warmer than that other which comes from a Mineral Origin; but the great Reason of the Difference which suits one Kind to one Soil, and another to another, is the Consistence. The Wood Soot is in firmer and harder Lumps; the Coal Soot is crumbly; now in a clayey or a mossy Soil, the Lumps of the Wood Soot would lie a long Time unbroken, whereas the Coal Soot breaks and mixes immediately. Experience shews also, that the Wood Soot will lie in large Pieces a long Time in a chalky Land; whereas the gravelly Sands, and sandy Loams, cut and break it to Pieces in two or three Plowings, and spread and mix it thoroughly.

Perhaps it will be found, upon farther Experience, that the Benefit of Wood Soot is more lasting than that of Coal : but what the Farmer expects from Soot is, an immediate Effect upon the Corn. And in this he is not disappointed, even on his coldest clayey Lands ; for the Effect is like Magick. If the Soot be sprinkled early over the Land, the first Shoot of the Corn will presently be enough to preserve the Root, and stand all Injuries ; and the Virtue will continue with it to the full Ripening. A Field that has been dress'd with Soot may be distinguished from one that has not, only by the Appearance of the Crop, at any Time. There is a Strength and Freshness the Soot gives, that nothing else can.

Soot goes a great Way upon any Kind of Land. In general, a Bushel of it, if it be tolerably good, is equal to a Load of Dung. Twenty Bushels of Soot is a very fair Allowance for an Acre.

Sheeps Dung, as has been said already, is, of all Manures, the very best for a dry Chalk; but the next in Value to that is Soot. For the sandy Soils Lime and Soot are the two great Improvements; and the Advantage of Soot on Gravels would be much better known than it is, if it were not that the Practice of folding took its Place; than which indeed nothing is better.

The best Season for laying on of Soot is toward the End of FEBRUARY, and as the Quantity that is necessary is so small, in Proportion to that of other Manures, so much the more Care must be taken to spread it evenly and regularly: the Spring Rains perfectly wash it in, when thus laid on; and the Effect is immediately seen.

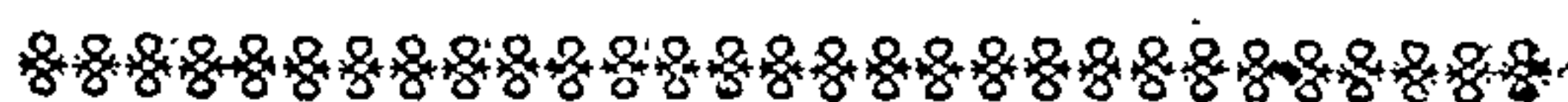
The Benefit of Soot is not confin'd to Corn Lands; for it is of equal Use on Pastures; and particularly on those of a clayey Soil. When the Coldness and Hardness of the Ground has scarce suffer'd a tolerable Swarth to appear of many Years, a single Dressing of Soot, sprinkled on before the Spring Rains, has been known to produce instantly, as it were, a thick Covering of a fine sprightly Green; with the Leaves full juicy and upright, and all the Signs of Health and Strength; and this has continu'd a long Time, though on Corn Land the Fruitfulness from the same Manure is short.

Coal Soot is greatly to be prefer'd to Wood

Soot for Pasture Grounds; for as there is there nothing to break the Lumps of the latter, they might lie a great while, and give up half their Virtue to the Air, instead of enriching the Land. The Coal Soot, on the other hand, washes all in immediately. After half a dozen Showers, if the Soot were pure and fine, it is not to be seen that any thing has been on the Ground. Ashes are often mixed with Soot, by those who sell it, for the Sake of greater Profit, but here the Cheat is at once discovered.

I would advise the sprinkling a larger Quantity of Soot on Pasture, than the Allowance for Corn Lands: about thirty Bushels to the Acre: and this is worth while, as the Effect is so much more lasting.

The Writers on Husbandry direct forty Bushels to an Acre of Corn Land; and though the present universal Practice allows but about twenty, perhaps the Farmer would find he got more, in the End, by this double Allowance, even to his plowed Fields.



## C H A P. XXXVIII.

*Of Apes.*

ASHES of every Kind whatsoever, are of great Use to the Farmer, but in these there is a great deal more Difference arising from the Materials which yield them, than in Soot.

Ashes as they come under the Consideration of the Husbandman, may be reduced to three general Kinds. 1. The Ashes of his common Fires. 2. The Ashes made by burning Stubble, Fern, Furzes, and other useleſs Products of the Land; and, 3. The Ashes of the Land itſelf produced by what we call Burnbaiting; which laſt ſhall be treated of after the others as a diſtinct Article, and in a different Chapter.

The first of these Heads may naturally enough be consider'd also in a double Light, for there is a great Difference arising from the Fuel; the Ashes of Sea-coal being different from the Ashes of Wood; and those of Peat from both.

In general when the Farmer's Fuel is Wood or Peat, the Ashes of his Hearth differ very little from those of burning Fern or Stubble; but when he burns Pit or Sea-coal, they are quite of a different Nature.

I heard in LANCASHIRE a very great Account of the Ashes of what they call Cannel-coal; but upon examining strictly into that Matter, I think them inferior to our common Sea-coal Ashes: for they have no more Richness, and they want that Harshness or Sharpness which the others have. So that they enrich no more, and they do not divide the Land so much as the common Coal-ashes.

The Ashes of Scotch-coal, which are also white and soft, are of a middle Nature between the LANCAshire Cannel-ashes, and those of the LONDON Sea-coal. They are better than the former, and not so good as the latter: and this for the same Reason, as the others are worse, they want Harshness to cut a tough Soil, and this



this is one great Advantage arising from the Use of all the firmer Kinds of Manures.

Wood-ashes enrich a Soil more than Coal; the Coal-ashes divide a Soil more than they, and they enrich it also at the same Time, tho' in a less Degree: Coal-ashes are therefore best for a tough clayey heavy Soil, and Wood-ashes for a light, poor and barren; or a too wet Land. In general cold and damp Lands, are they which receive most Advantage from Ashes of whatever Kind.

Some Farmers think themselves very frugal in buying up the Wood-ashes, after they have been used in the bucking of Linnen; but they deceive themselves in this, for those Ashes have altogether lost their Salt, and are little more than so much barren Dust. I have seen great Disappointment from this Frugality.

Wood-ashes when they are fresh and full of their Salt, should be used alone. Coal-ashes having less Richness, are best mix'd with Dung: Horse Dung is fittest for this Service; or else the Compost of all Kinds of Dung together, which has been before describ'd; and this Way they make an excellent Manure. The Sharpness of the Ashes opening the Land in a surprizing Manner, and letting in the Virtue of the Dung.

Any Soil of whatsoever Kind that is too damp, will have Advantage from a good dressing of Ashes: and where the Dampness is the principal Fault, Coal-ashes are found to succeed better than those of Wood.

Soap Boilers Ashes after they have done with them have also great Virtue.

It is for this Reason of their correcting damp Grounds, that Ashes, and especially the Kind last mention'd, are so famous in LANCASHIRE, and other Places, for the Improvement of their mossy Lands, and destroying Rushes.

As to the Quantity of Ashes to be us'd as a Dressing, four Load of Wood-ashes, and six of Coal-ashes, are the general Allowance for an Acre, but I think the Quantity may be increased with Advantage; and especially that of the Coal-ashes, which in Countries where Coal is the Fuel, are cheap enough, costing nothing but Carriage.

I have observ'd that the Ashes which have been us'd in bucking have no Virtue. We see by this that Wood-ashes may be robbed of all their Efficacy by Water; and for this Reason they must be laid up for use in some dry Place, and no Wet of any Kind suffer'd to come near them: otherwise the Farmer may chance to lay Dust upon his Land when he thinks he is giving it a rich Dressing.

Coal-ashes having a Salt also, though not so much as Wood-ashes, must be kept dry in order to preserve their Virtue; for if they lie expos'd to the Rains, they will be reduced to mere useless Matter: but it is found by Experience, that if these be moisten'd by emptying the Pots upon them from Time to Time; as also by throwing upon them waste Soap Suds, in which Cloths have been wash'd, or other such Liquors as have a Salt in them, they are enrich'd, and will go farther than alone.

The Ashes made by burning Weeds, Bean-stalks, Stubble, and other Vegetable Matters,

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are very little different from the common Ashes of the Hearth, where Wood is burnt, but they are somewhat lighter, and easily part with their Salt by the Rain. When they are burnt upon the Ground, they are also well scattered, and sprinkled equally, which does not always happen with such as are carried on in Loads.

To this Head are to be added Peat-ashes, which are of a particular Kind in this Respect, that they are lighter and softer than all others: but in general they are of the same Virtue with the Ashes of Vegetables; more like those of Stubble, and other light Kinds, however than Wood-ashes. All these give great Fertility both to Corn and Meadow Land; and the last nearer than any other, approach to that Kind which is made by burning the Surface of the Land, to be spoken of presently. But there is still this great Difference, that in the burning the Land the Soil is prepared to receive them.

The best Use of Wood-ashes is the strewing them by hand over Wheat Lands, in the very beginning of the Spring. This Purpose they answer best if they have been kept under Cover, and wetted gently with the emptying the Chamber Pots on them from Time to Time. The proper Quantity is about fifty Bushels to an Acre; and as they came cheap enough where Wood is the Fuel, this is no great Matter.

The Farmers in HERTFORDSHIRE and BUCKINGHAMSHIRE, have found by repeated Experience, that these Ashes answer the Purpose of their Soot Dressings perfectly well; they value the Discovery for its saving the Price of Soot: but the Farmers will value it on a double Account, where Soot is not to be had in Quantities, as is the Complaint in most Places in ENGLAND. The Encrease this top Dressing of Ashes causes to the Crop, is greater than they could conceive who have not seen it.

The Use of Wood-ashes thus prepared, is not confined to Corn Lands, they are excellent also on Pasture Ground; but on this there must be a larger Allowance: fourscore Bushels is about the right Quantity to an Acre. And in this use they not only cause an early and plentiful Shoot of the Grass, but they destroy those Insects which are apt to harbour about the Roots to the great Injury of the Land.

Coal-ashes preserved and wetted in the same Manner, answer excellently on Pasture Grounds, and fifty Bushels of these will go as far as eighty of Wood. What I have seen from Experience is, that on Pasture Grounds the Wood-ashes take a more immediate Effect, but that of the Coal-ashes is more lasting. The first Year's Grass will be more plentiful from the Wood-ashes, but the Effect is less afterwards, whereas the Coal-ashes continue their Efficacy four or five Years very well.

Coal-ashes are also excellent for Clover, Saint-foine, and the other Grasses of that Kind. The Way of using them is soon after the Depth of Winter, to sprinkle them at the Rate of fifty Bushel to the Acre, and the Rains washing them in they do excellent Service.

It is a Custom in some Places also to spread Coal-ashes on the young Wheat, but Wood-ashes are best of all for this Purpose.

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Where Peat-ashes are to be had, they exceed every other Kind for the Clover and Saintfoine. But being light there requires a large Quantity of them.

Beside these single Uses of Ashes, they do excellently well in many Composts. Wood-ashes are a very fine Mixture with Cow Dung: they also enrich the Heaps of Soil that are made from all Sorts of Refuse and Dung thrown together. And Coal-ashes are an excellent Addition to the Earth that is mix'd with Hens Dung; nothing so readily breaking the stringy Toughness of that rich, but untractable Manure.

Coal-ashes agree excellently with a clayey Soil, and Wood-ashes with the loamy and gravelly: but either may be us'd in the Place of the other without Damage in any Case; the only Difference will be, that there will not be quite so much Advantage where they are laid on inconsiderately; as where they are suited to the Soil.

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#### C H A P. XXXIX.

##### *Of Burnbaiting.*

**T**O the Head of Improvements of Land by Ashes, may be properly enough refer'd the great and valuable Practice of burning the Baite or Turf, called in some Places Burnbaiting, and in others Denstring of Land, from the Name of the County in which it was first a general Practice. Nevertheless it demands to be treated separately, because of the particular Method of doing it, and the great Advantage the Land receives from that Method of Management, and Application of the Ashes.

Burnbaiting is perform'd by cutting off the Turf of the Ground, piling it up in Heaps to dry, and afterwards burning it to Ashes; which Ashes are spread over the naked Surface, and plow'd in. This is the Practice in general Terms. It had its Name Burnbaiting from Baite, an old ENGLISH Word for Turf. For the Sake of the practical Husbandman I shall lay down some Instructions relating to the Manner of performing it, before I enter on its Advantages, which I hope to teach him not only to obtain but to preserve. This last Article is a Secret yet unknown to all our Farmers.

In the first Place the cutting off the Turf, as it is universally done at this Time, will admit of great Improvement. The present Method is this.

A stout Labourer pushes a Breast Plough before him by the Strength and Weight of his Body and Arms, at a small Depth under the Turf. This is a plain and poorly contriv'd Instrument, consisting of a Kind of Share, with an Edge for cutting the Turf, a Handle, and a cross Piece at Top. They pare off the Turf with this about an Inch thick, more or less, according to the Quantity of Roots, or other Vegetable Matter there is in it; for the more there is of this, the thicker the Turf is to be taken off. It is thus cut into Pieces of a Foot and half long, and nine or ten Inches broad, and turn'd that it may dry.

It is evident that a Plow with a proper Share, drawn by a Horse, would perform this Business in a much quicker and more advantageous Manner. There is a very convenient Instrument for the Purpose, describ'd in a late Treatise on this Subject; which though I have not seen us'd, yet is so plainly useful and fit for the Purpose, that I shall propose it to the Farmer's Consideration.

A hollow Plowshare rising with a sharp Edge in the middle, from the Point to the Top, and having a Fin both Ways, beginning at the Point and running back to the Share, must be fix'd to a light and strong Piece of Ash sharpen'd forward, but left thick and strong behind.

The Share should be two Foot broad from Point to Point of the Fins behind; a Foot long; and a Foot high. To the End of the Ash Pole must be fasten'd a strong Piece of Wood nearly perpendicular, but hanging a little backward: this must be two Foot high, and on the Top must be a cross Piece for fastening the Harness of the Cattle. This is easily understood, and any Country Workman can execute it.

The Handles of the Plow, and the Earth Boards to turn the Turf, are to be fix'd also into this square Head. The Instrument is then compleat, and every Plow Boy will be able to manage it properly with a little Instruction.

He must begin at the Edge of a Field, and as he goes on, one Turf will be turn'd toward the Fence, the other inward. When he returns he must direct the Plow just along the Edge of the last mention'd Turf, for it covers a Part of the Ground that is not cut up. This will be cut up at the Return, and turn'd over with the other.

In this Manner the whole Field is to be pared; and the Turf will then lie in long Pieces reaching from one Side to the other. There requires after this the cutting it into Lengths: but this must not be called an additional Trouble, the former having been so very trifling in Comparison of what is commonly requisite to that Purpose. The Gentleman who invented the Plow, has also contriv'd a very plain and simple Instrument for this Purpose.

A Roller is to be made of the Trunk of a sound Tree, firm, large, and heavy. It is to be hoop'd round at every two Foot, and from the middle of each Hoop is to rise all round a Blade six Inches deep, stout at the Bottom to support it against bending, and sharp at the Edge. The Roller thus arm'd, is to be drawn over the whole Field Cross-ways; and its Weight pressing the Edges all the Way down, the Turf will be cut through and through at every two Foot. By this Means the whole Surface will be cut into Turfs of two Foot long, and one broad, which is a very proper Size.

Having thus given a convenient and expeditious Method of cutting up the Turf, we are to proceed to the drying, piling, and burning of it: for howsoever plain and simple this Operation may seem according to the few Words in which the Writers on these Things have described it, a great Part of the Benefit the Farmer



mer is to reap from it, depends on a very critical Regard to every Part of the Process.

If the Soil be light, and the Weather hot and fair, the Turf will dry with once raising up and turning: but if either its own Dampness, or the Wetness of the Season prevent this, it must be piled together as hollow as may be, in little Heaps; where Passage being left between the Turfs for the Wind, they will quickly be dry'd. Sometimes just setting them on Edge against one another will answer the Purpose.

When they are dry enough for firing, the Turf will in some Places burn singly and of itself; in others it must be assisted with more inflammable Materials. The Farmer may know whether he be to fire it alone, or to give it this Addition by observing its Nature as 'tis turn'd up.

When the Soil is very poor, the Turf thin, and few Roots among it, it will not do alone. On the other hand where the Soil has been better, the Turf cut deeper, and there is a great deal of Roots in it, and of Stalks, and dry Leaves upon it, 'twill burn alone, and he is to give it no Addition.

In the other Case he is to strew a little dry Heath or dry Furzes under every Heap, and if it be very poor, and he make his Heaps large, he must mix some of the same dry and inflammable Materials among the several Turfs of every Heap.

'Tis best, however, to make the Heaps small, whatever be the Soil, or the Condition of the Turf; for thus they always burn best, and being more numerous, they improve more of the Surface of the Ground in the Act of burning: for 'tis not only by Means of the Ashes that barren Grounds thus treated are improv'd, the very heating of them by these several Fires tends to divide their Particles, and encrease the Fertility they are gaining.

Some make a great Art of raising these little Heaps of Turf for Burnbaiting, composing them of ten or a dozen Turfs each, which they twist curiously together, leaving a Hollow within; and Holes between in several Places, as if they ty'd them into Knots like Ribbands, or imitated the Flourishes of a Writing Master's Pen. They then draw in Pieces of Furze between the Holes, and fill the hollow Part with it. To this there is no Objection, but that it is a great deal of needless Trouble.

A good Wheel-barrow Load of the Turf is sufficient for each Heap, and if they are of the poor Kind, a little dry Furze should be laid upon the Ground under and between them, this is all that is needful. The Labourer then is to set them up end-ways, and edge-ways, as loose as he can; and when all the Heaps are thus rais'd, and have stood a Day or two for a farther drying, the Furze is to be set on Fire; and they will catch from it, and burn away sufficiently for the Farmers Purpose.

Let us now examine the Matter of burning them: for on the doing this properly, as much at least depends as on any Part of the Work. Many a Husbandman after all his Toil and Expence, has lost half, nay, two thirds of his Advantage from the single Circumstance of not

regarding, or not knowing the proper Degree of burning.

Now in order to explain this it is to be observ'd, that Fire carries off all the efficacious Parts of most Substances; but this it does gradually; and the Progress may be seen. The Farmer wants to reduce this Turf to Ashes; but as he wants these Ashes to enrich his Land, he should get them as full of Virtue as he can.

If a Plant of any Kind be put into the Fire, it burns away to Ashes, but these Ashes at different Times of the burning differ very much in Appearance, and also in their Qualities. When the Plant first falls into Ashes, those Ashes are of a blackish grey; and as they continue in the Fire they become paler and paler, till they are at length perfectly white. While they are of a dark grey, they have a great deal of Taste, but when they are burnt white, they are only a little brackish.

The Philosophers and Chemists tell us, that this Colour is owing to the Oil of the Plant, as also the Taste; and that this Oil, burning away, leaves the Ashes pale, and of half their Virtue. Very likely this Account is true. The Colour and the Taste must be owing to something, and whatever that is, it burns away afterwards. Whether it be the Oil or not matters nothing.

We don't know what Principle it is in Ashes that gives Fertility to the Ground; but whatever it be, 'tis best to preserve it as entire as possible. Now let us apply this Reasoning to the Husbandman's Burnbaiting, and we shall soon see the Result of it, and what Practice it directs.

Let the Farmer mark the Course of the Operation in the burning of one of these Heaps of Turf. He will find, provided the Fire go on well, that at first all the Heap looks blackish and dusky; then the Turfs which compose it, after a Time, begin to crack and crumble to Pieces: a little while after this he will see them moulder into an Heap of redish or yellowish Ashes, with several Lumps among them; and a while after this a great Part of the Lumps will moulder away, and the Ashes, in most Parts, become of a pale grey; and in some Places whitish.

It is easy for him, from the before mentioned Directions, to know in which of all these States the Turf is fittest for his Purpose. While it is black and holds together, it is burnt but imperfectly; when it begins to crack and crumble to Pieces, it comes nearer to a Condition for his Service: but the true State in which it is to be used is, when 'tis moulder'd to Pieces, but yet retains a yellowish or redish Colour: the Ashes are at this Time thoroughly made, and yet they retain their full Virtue. After this, every Minute that they continue on fire, they lose some Part of their Goodness.

We now naturally are led to consider the proper Degree of Fire, for the bringing the Turf to this State, with least Loss of the Virtue in burning.

All Violence of Heat wastes the Virtue of the Turf, which the Farmer wishes to have remain in the Ashes: therefore he is to contrive to burn them by a slow and mouldering Fire. For this Reason the less additional Fuel he uses the better; and that there may be Occasion for as little as possible,



possible, he will do well to dry the Turf as perfectly as he can first. It is for this Reason also, principally, that the Ashes made from rich Turf, are found better than those from such as is poorer, for the rich Kind consumes by itself, and that slowly.

I have known a Farmer who thought he was doing his Business to great Perfection, in this Article, dry his Turf so well, and then put so large a Quantity of dry Furze under and between each Heap, that the whole Virtue of the Turf has been sent into the Air, excepting what remains in all Ashes. Every Heap has blaz'd away like a Bonfire, and the Ashes have remain'd white, and in a Manner insipid.

To preserve the full Virtue of the Ashes, a slow smothering Fire is best. And this the Farmer is also to recollect, that the Inside of his Heaps will be always more burnt than the Outside, so 'tis enough, in many Cases, if the Outside be well crack'd, and ready to break to Pieces with a small Blow. In this, however, no general Rule can be given, for the Nature of the Turf differs so much, that some will hang together till struck, when it is over-burnt, and other Kinds will break and fall in before they are half reduc'd to the proper State. I have taken the only general Method; that is, informing him of what is the right State of the burnt Turf, for giving its full Virtue. And his Eye must watch this, and take the proper Opportunities of continuing or stopping the Burning, when it is needful.

The Farmer may guess, by the Nature of the Turf, what Degree of Fire it will bear, and what Addition of Fuel it will want: this he is thoroughly to weigh before hand, for on this a great deal depends. The Practice succeeds best when the Hills burn just as long as they should, and so may be left standing whole upon the Ground; and this will depend upon the Quantity of Fuel, join'd to their own different Nature. If too much Fuel have been given them, as in the Case of the foolish Farmer before-mentioned, and they from thence continue burning within, after the very Outside is done enough, then he is to break and spread them a little, so as to make them go out: but it is much best when they go out of themselves, and remain properly calcin'd and whole: for when they are thus broke and scatter'd, if a windy Day come, half the Ashes will be blown away.

We will suppose therefore, according to the Directions here laid down, the Heaps so well made, and the Fuel so justly proportioned to the Nature of the Turf, that the Hills are all sufficiently burnt and stand entire.

In this Condition the Farmer is to leave them till thoroughly cold, and if that happen in any reasonable Time, till there has been a good Shower or two of Rain; he is then to prepare for spreading of them: and for this Purpose he is to take the Advantage of a calm and still Day.

He is to begin with paring the Surface of the Earth up to three or four Inches Depth all about each Hill, and then removing the Hill a little, he is to pare it somewhat deeper, just under its Place of standing. These Parings of the Ground

are to be thrown upon the Hill, and all is to be broken and mix'd together.

It is proper to explain the Use of this Part of the Operation. I would have the Farmer receive nothing upon Tradition; but all from Reason. I have observed before, that not only the Ashes of the Turf fertilize the Ground; but this very Act of burning; the real and actual Effect of the Fire does great Service to the Land; so far as it reaches. A greater Degree of Fire alters the very Quality of Earth, and renders it unfit for Vegetation, but Fire, in this Degree, only heats it enough to divide it, which is one great End of all Dressings whatsoever.

Now as the Earth that was under these Hills, and that just round about them, would be thus rendered more fruitful than that between one and another of them, at a somewhat greater Distance; the Land would afterwards be fruitful in Spots and Patches: or the Crop would be too rank in these Places, and starved in others.

To prevent this, the Farmer is directed to pare away the Earth under and about each Hill; and mix it with the Ashes of that Hill. By this Means the Quantity of these Ashes will be encreased, and they, together with this Earth which is thus enriched beyond the rest, will be regularly spread over the whole Field; and every Part of it will enjoy an equal and a great Degree of Fertility.

Some add Lime to the Ashes, in the Quantity of about half a Peck to every Hill, supposing each Hill made of a single Wheelbarrow full; or more, as the Hills are larger. They put this in under the Hill, or among the Ashes; and don't stir it till Rains have come to flake it. This adds to the Fruitfulness that follows, but it is not needful; for there is enough without it: nay the Danger of a Piece of Land that has been well dress'd in this Manner is, that it should be too rich, and make the Crop over rank. I therefore advise the Farmer to make no Use of Lime, or any other Addition to the Ashes, except the Earth, par'd up as before; and he may be assur'd of sufficient Encrease.

The best Season for undertaking this Business is about the Middle of MAY, for at that Time the Surface of the Ground is generally in a good Condition for burning. The APRIL Rains have made the Roots shoot out, and the ensuing Warmth has dry'd it. Beginning at this Season also, he will have Time for waiting every Opportunity, to take Advantage of Weather, and all Accidents, and will have his Ground in thorough Order for his Seed.

After this burning and spreading the Ashes, he has nothing to do but to plow the Land, and sow it; and this plowing must be the slightest imaginable. He must go to no Depth, and only just turn in the Soil, with the Ashes upon it, so as to mix all together, and then sow his Corn.

Another Particular also is, that the Farmer here saves half the Expence of his Seed Corn. One half the Quantity that is allowed to other Lands, is sufficient for these, after burnbaiting, and the Crop is very abundant. It is most profitable to sow Wheat the first Year; and 'tis best to sow it very late: the first Week in NOVEMBER



BER is soon enough, and this Way it will flourish and yield a vast Abundance.

Few who have not seen the Effects of Burnbaiting, cou'd conceive how profitable a Method of Dressing it is. And what should recommend it the more strongly to general Consideration, is, that it is not to be used on Lands that are good in themselves, but on the very poorest and worst, and never fails of Success.

Burnbaiting should never be practised on rich Soils at all; nor is it proper on the stony, gravelly, or chalky Kinds: or indeed for any Lands that have been kept long in Tillage. Every thing should be apply'd to its right Purpose, in order to the yielding of its best Advantage; and the proper Use of this Method is, for poor, barren, rushy, and heathy Grounds, that have lain a long Time untill'd, and are of little or no Value.

I have given the Farmer at large, the whole Method of this excellent and useful Practice. He is instructed perfectly in the Art of obtaining, by this Means, an excellent Crop from the most worthless Land.

The Advantage is not confin'd to one Year; it will very well last three, and in those it is easy to obtain, from such a Piece of Ground, as much in clear Profit as would have purchas'd it at the full Value. The Husbandman is content with this, and he leaves the Land as he found it: for the Effect of Burnbaiting does not last more than three Years; and at the End of that Time the Ground is left full as poor as it was before. This forced Fertility has indeed so thoroughly exhausted its Strength, that it will not be fit to bear any thing afterwards, till it has had a Rest of ten or a dozen Years.

But though the Farmer is content with this three Year's Profit, from his burnbaiting of Land, there is no Necessity that he should be so, nor are his Profits confin'd to that Time, unless by his own Indolence. This is a Thing that has been mentioned before; and 'tis a Wonder the Farmers have not universally consider'd its Importance.

Let them thoroughly understand this Matter. Burnbaiting, and dressing with Dung agree in this, that they both render Land fertile for three Years. The Difference between the two Methods is this. At the End of the three Years Fertility from Dung, the Land is ready to receive another Dressing; but in the burnbaiting Way it is not.

What then can be so plain, as that if it will not receive the common Dressings at the End of the three Years, they should be offer'd to it in the mean Time. It will receive them if they be; and here lies all the Secret.

Dung raises but a moderate Fertility, and is used to Land that was not bad before. Burnbaiting is employ'd on Land that was good for nothing before; and it gives, the first Year, a prodigious Increase. It might bear recruiting after this, exhausted as it was; but after two Years more being exhausted, without any Supply, it will not. It is then too much impoverish'd to receive Good from any thing, like Animals after too long an Hunger, that die when they have had Food.

Nº 8.

Upon this reasonable Plan I shall propose a Method to the Farmer, by which, having recover'd such a Piece of Ground from Barrenness, he shall keep it good and fertile for ever after. It is no more than this.

After the first Crop is got in, let him prepare it for the second by any common Manure. This being offer'd before it is quite exhausted, will be readily received; and by this single Act it will be brought to the Condition of other Land, and may be treated, in the same Manner, as a better Soil for ever, in the common Methods, and with the common Advantages.

If Marle can be had, and I have shewn already that Marle is to be found in most Places, where the Farmer will have the Industry to search after it; let the recovered Land have a middling Quantity of Marle laid on it, between the first Crop and the second Sowing. This will be extremely worth the Farmer's while, for after this it will be at once in the Condition of other marled Lands; and being treated like them, will yield in the same Manner.

If Marle cannot be had, a common Dunging will do; or what is much better, a Compost made of Horse Dung, Cow Dung, and River Mud. The Farmer may take his Time for getting this ready; and it will not fail to answer his largest Expectation.

I have thus shewn what vast Advantages arise from this Practice of Burnbaiting, and in what Manner they may be continued: I have observed that it is a Dressing only to be given to the worst of Soils. But although these alone require it in the full Extent and Degree; yet there is no Reason others which do not want it so much, should be wholly deny'd the Advantages of the Practice.

We see that Ashes are an excellent Manure; and we see that the Heat which is given to the Earth, by the burning small Quantities of vegetable Matter upon its Surface, is a vast Improver of its Fertility. Now Ashes may be a very proper Manure for Lands that do not require absolute and thorough Burnbaiting; and if we give them Heat at the same Time, it will certainly be better.

On this Principle the Farmer will do well, on many Occasions, to make those Ashes upon the Land, with which he intends to manure it; and he will so have the Benefit also arising from this heating of the Ground. This Practice is already followed on many Occasions, and I shall recommend it on some others. And as this does not require the absolute burning of the Baite, or Turf itself, I shall distinguish these by the Name of Bastard Burnbaiting.

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## CHAP. XL.

### Of Bastard Burnbaitings.

THESE Methods have been in Practice in many Places, and in all Ages, though not distinguished by any particular Name. It might have been said, and it has been said by many, that the Practice of Burnbaiting is as old as any thing we know of Husbandry; the Poet VIRGIL is quoted by every little Essayist in this Way, for describing



describing it, and it might be added, that all the old ROMAN Writers on Country Affairs have named it. But if we take in these bastard Burnbaitings, the Assertion is much more just, and the Practice may well be said to have been not only very antient, but in a Manner universal. Some of these Writers speak indeed of burning the Soil itself: but they all talk of firing its Produce upon it, such as dry Stubble, Haulm, and the like; as also of burning other Matters upon it brought thither for that Purpose. These Practices are what I call bastard Burnbaitings, which Term comprehends the burning the Refuse Product of the Land; or whatsoever is brought to it, and laid on it for that Purpose: in short, the burning any Thing except the Turf, or upper Covering of the Land itself; which in true Burnbaiting is cut up for that Purpose.

We have seen that this Practice was very antient; and we find to this Day that it is beneficial. Ashes are a good Manure; but they are of ten-fold Value when made upon the Land. Men seem to have been instructed in this Practice as it were by instinct, for they have fallen upon it in Places where they could not have been taught it by one another.

In all the Accounts of the Practices of the EAST INDIES, we read that in CEYLON, they burn off the dry'd Stalks of their Harvest to prepare the Land for a next Year's Crop: and those who have given us the first Accounts of AMERICA, join in telling us that the Natives used always to spread dry Wood over their Lands, and set it on Fire by way of cultivating the Ground. The Ashes fell pretty regularly this Way; and the Ground was well and uniformly heated by the Fire, so that it could not fail of yielding a good Crop; and this, as it was not so severe a Practice as burning the Turf, would not be of that ill Consequence to impoverish the Land for future Years.

In Places where Wood is plentiful enough, there could not be a better Method than thus spreading dry small Wood over a Stubble Field, and burning that and the Stubble together. Let us not be ashamed to learn even from Savages, when their Practice is founded on Reason, and supported by Experience.

I shall consider this general Practice of bastard Burnbaiting under four Heads, as it regards. 1. The burning of Sedge on wet Lands. 2. The burning the Stubble upon Corn Fields. 3. The burning any waste Product on Heaths and Commons; and, 4. The bringing on Materials to the Land, and burning them there.

The burning of Sedge on wet Lands is a very old Practice, and has always been a very successful one. In these Places the Grass is often short and sour, and there grows a Kind of low Flag; whose Leaves take up more Room than all the Grass. These are usually yellow, and look in a decay'd State; and in OCTOBER or thereabouts, they become dry and strawy. They then cover the Ground so, that there is scarce any Grass to be seen, and they are dry enough to take Fire.

In this Case the Farmer is to take the Advantage of a very dry and moderately windy

Day, and to set Fire to a whole Edge of the Field, that the Flame may be carried before the Wind. The whole Ground will be cover'd with Flame in a few Minutes, and soon after with a Kind of light black Ashes. He is now to wait for the first Shower to damp them a little, and immediately upon this to sow the whole Ground thick with Hay Seed.

Very often it happens that the Winds take off the whole Quantity of the Ashes from the Ground, but even then the Advantage is not lost, for the Heat arising from the burning, has killed the Roots of these Flags that lie just at the Surface, and has prepared the Ground to receive the Seed, which soon takes Root, and overpowers any other Growth, so that in Spring it shoots up at once, and grows immoderately. There never fails to be a very fine Swarth from this Practice, however contrary the Season may have been; but if a little Rain have fallen, and the Ashes are well wash'd in with the Seed, the sudden Shoot is surprizing; and the Weeds never recover themselves.

In other Places of the Fen Lands where the Ground is spongy, and cover'd with Rushes, they turn up the Turf with a Breast Plow, and burn it on the Soil, afterwards sowing Hay Seed instead of Corn. This is absolute Burnbaiting, only as Grass does not exhaust Land like Corn, it has not the Disadvantage of impoverishing it in that Manner for many Years after. This will continue good Pasture Ground a great while without any other Care.

This is a needful Practice in such Grounds, because their Wetness is not to be corrected by a mere burning of the Sedge; and Rushes are too firmly rooted to be destroy'd by that slight Method: but in the Isle of ELY where this light Flag over-runs the Surface, I have seen the Practice of firing it without stirring the Ground, used to very great Advantage; and though begun there but a few Years ago, and only in one particular Place, it is becoming universal. The Advantage procured the other Way is greater, but this is easy, and it satisfies the Farmer.

The burning Stubble upon the Fields is an old and a common Practice, and though the Ashes made this Way are light, and but a small Quantity, yet the Heat that is thus given to the Ground, makes such a Dressing better than the laying on four Times the Quantity of the best Ashes brought from elsewhere.

Experience shews, that this Practice of burning the Stubble succeeds excellently upon those Lands that are used to feed the Straw and Leaf, and starve the Ear. The Farmer frequently finds Lands that yield a full Stalk, and a poor Ear; and others that lengthen and fill the Ear, while the Stalk is short. He cannot tell the Reason of this, nor perhaps the best Philosopher for him; but he may learn from Experience, that the burning of Stubble upon the worser of these Lands, brings them into the Condition and Nature of the better.

When the Farmer intends to burn his Stubble, the first Thing he does should be to plow up the Land under the Hedges; for it has often happen'd, that by the Wind the Flame has been driven to the Hedge, and catching hold of decay'd



cay'd Branches, has done vast Mischief.

Although I have not recommended the Use of Lime with the Ashes made by a perfect and right Burnbaiting, yet for this Purpose they are excellent, and a sprinkling of Lime thrown among the Ashes all over the Field, and the whole plow'd in after it has lain to flake with two or three Showers, is a prodigiously rich Manure. I have experimentally known so much of the Advantage of this Practice, that I strongly recommend it to the Farmer.

The Benefit of burning the waste and uselefs Product upon barren Commons, even without paring off the Turf for that Purpose, is not sufficiently known. The Way is to stub up the Broom, Heath, or other waste Matter, and pile it in little Heaps, throwing over it what Earth has been rais'd in the getting at the Roots: these Heaps being all prepared, are to be set on Fire in a still Day, and left to burn away to Ashes, which they do presently. The Earth that is thrown upon them is well calcin'd by their burning, and though perhaps reduced to a State in which it would not be fit singly for the Growth of Plants, it becomes an excellent Manure.

Nothing need be done to these Parcels of Ashes, and calcin'd Earth, till they have lain to be drench'd a little by the Wet. They naturally fall in tolerably regular Heaps. When they have been well wetted, the Husbandman is to take Advantage of a dry and still Day to spread them regularly over the Land; and then the sooner they are plow'd in the better.

Lime is an excellent Addition to the mix'd Ashes made by this Kind of Burnbaiting, but it has not been mention'd in the general Account, because Lime is a Manure that does not agree with every Soil. The Ground in these heathy and broomy Commons is often clayey; and as often light and hollow. When it is clayey, the Method just now describ'd is to be used without farther Addition, for Lime will never do well upon Clay: but when the Soil is light and hollow, then let the Farmer lay upon every Heap of Ashes, half a Bushel of good Stone Lime, mixing it a little with the Ashes: and then let him leave all as before for the Rains to damp the Ashes, and at the same Time flake the Lime: after which let him spread them as before directed, and plow all in.

A great deal in all these Improvements is left, and must be, to the Discretion of the Farmer: for if he do not suit his Manure, and his Manner of using it to the particular Soil he has to work upon, he does nothing even with the best Materials, and the most indefatigable Industry.

In all the Cases hitherto mention'd, this last alone excepted, these bastard Burnbaitings are only a slight Imitation of the real and thorough Burnbaiting, and though they may to save Expence and Trouble, or to suit particular Circumstances, be used instead of the perfect Method, they never succeed so well. There are Cases where the right Burnbaiting is not proper, as has been said already; but wherever it is,

though the Cost be greater than that of these slighter Methods, the Consequence makes amends. The last mention'd Case I particularly excepted; for the Lime here is a very material Part of the Dressing.

When this Method has been carefully executed upon a right Kind of Soil, though ever so barren, the Effect of the Ashes, the calcin'd Earth, and the Lime, together with that of the Warmth given to the Earth itself about the Heaps is such, that scarce any other Method whatsoever succeeds more perfectly, or more happily for the Farmer.

This is an easy and a cheap Practice. It is done with little Labour, and if the Lime be burnt by the Farmer himself for his own Use, as before directed, with very little Charge; it takes Effect upon the most barren Soils; nay, it is best of all suited to the very meanest and worst Lands: what would the considerate Husbandman wish more? or why should not every Land Owner who has such Grounds in his Possession, order it immediately into Practice. He need not make the least doubt whatsoever of a great Return.

In the last Place I am to mention that Kind of bastard Burnbaiting which is perform'd by bringing Sticks, Stubble, Haulm, and other waste Stuff upon the Ground, and burning it to Ashes. Many have supposed that this Practice did no more Service, or was in effect nothing more than the Dressing the Land with Wood Ashes, bought and brought on for that Purpose: some have ventur'd to deliver as much in print, but they are greatly mistaken. It has been observ'd already, that the heating the Earth in such a Degree as is done by the making small Fires upon it, is of itself a great Assistant to its Fruitfulness; and this makes a very great Difference between one and the other of these two Practices. In this Matter the Savages of AMERICA are better Directors to the ENGLISH Farmer than these Writers. They dress their Land with Ashes, but, as before observ'd, 'tis always with Ashes made upon the Spot, so that the Land has the Advantage of the Heat as well as of the Ashes.

If any one can doubt whether there be really this good Quality in Heat, for giving Fertility to Land, let him observe the Effects of these two last mention'd imperfect Burnbaitings. In the others, Care is taken to mix the more improv'd Part of the Soil with the less, and consequently all is equally fertile. But in these two last the Ashes alone, or mix'd with Lime, are sprinkled and plowed in, but nothing else is done. Now let the Crop upon either of these Lands be regarded attentively, and the Observer will find, that although the whole Field is fertile, yet there are here and there round Spots on which the Corn is fairer and finer than in the rest. And when he examines the Matter strictly, he will find that these are the Spots on which the several Heaps were burnt.

The Ashes made by that burning have been carefully spread; and they have therefore not been more abundant in one Place than another: to what then is this particular Fertility of these

Spots



Spots owing? the Answer is very plain, for there is but one Thing to which it could be owing; it is to the heating of the Ground under and about those Heaps.

Let this instruct every Farmer who intends to dress his Corn Land with Ashes, to burn the Materials upon the Place. Practice shews, that the lighter these Materials are, the more Fertility there is in the Ashes. Now the Stuff burnt on these Occasions is much lighter than the common Billets used for firing. This therefore is some Advantage, but the heating of the Ground is a much greater.

Thus although the perfect and thorough Method of Burnbaiting of Lands have on many Occasions a much greater Effect than any of these superficial and imperfect Imitations of it; yet the Farmer, after this Account of their particular Uses and Advantages, will not think the Time ill employ'd, that he has spent in reading

this brief Account of them, severally, and distinctively laid before him.

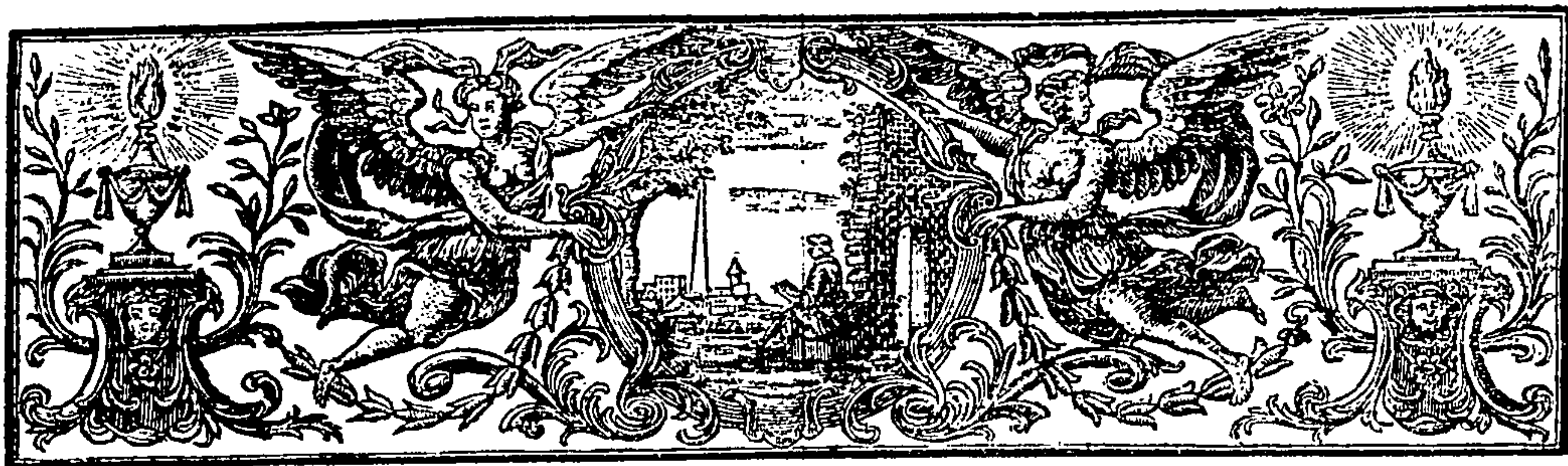
The perfect Burnbaiting is proper only for certain Soils, and on certain Occasions; but the Benefit arising from it is so great, that it will grieve a considerate Person, that he must lose it because the Circumstances where he would wish to employ it, do not perfectly suit. To remedy this Misfortune, these several different lighter Imitations of that excellent Practice have been laid down.

The Farmer will see according to these several Descriptions, in what Manner, and on what Occasions he is to employ them: and he may have this Comfort in the Use of them, that when he can only employ the lighter Kinds, his Lands have not Occasion for the more perfect: and that, if though additional Encrease be less, the Expence also is less which procures it.

End of the SECOND BOOK.







# A COMPLEAT BODY OF HUSBANDRY.

## BOOK III.

*Of the Improvements of Land by Inclosing and Draining; and of the several Kinds of Fences.*

### CHAP.

1. *Of the great Advantages of Inclosure.*
2. *Of the more particular Benefits of Inclosure, and the Objections against it.*
3. *Of the several Kinds of Fences.*
4. *Of Ditches, and their Use in Fencing.*
5. *Of Draining in general.*
6. *Of draining boggy Lands.*
7. *Of draining fenny Lands.*
8. *Of draining flat Lands near great Rivers.*
9. *Of the Ordering of Saltmarshes.*
10. *Of Hedges.*
11. *Of raising the Quickset, for a White Thorn Hedge.*
12. *Of making the Hedge.*

### CHAP.

13. *Of the Seasons for Planting, and the Choice of White Thorn.*
14. *Of keeping the Hedge in Order.*
15. *Of the Plashing of a Hedge.*
16. *Of the Profit that may be had from Hedges.*
17. *Of the Sloe, or Black Thorn Hedge.*
18. *Of the Furze Hedge.*
19. *Of the Holly Hedge.*
20. *Of the Elder Hedge.*
21. *Of the Use of the Crab, Sallow, Alder, and Bramble in Fencing.*
22. *Of the Bank Fence, with its Plantation.*
23. *Of the Wall Fence, with its Plantation.*

## THE INTRODUCTION.

### *Of Inclosure in general.*

HAVING given the Husbandman Instructions for understanding the Nature of his Soil; and for the meliorating and enriching it by the several Kinds of Manures; we are to advance to an Improvement of another Species; that which is to be made by Inclosure: which is not only great in itself, but is the best of all Assistances to the several other Kinds.

If it be said, this in the general respects the Land Owner, rather than the Farmer who rents his Ground, we answer, That it is the Purpose Numb. IX.

and Design of this Work to instruct both: nor is it possible to form a Wish more advantageous to this Kingdom, than that the Gentlemen who are Possessors of Land, would join with the Husbandman who commonly rents it, in this great Undertaking of Improvement.

But though inclosing in the first Instance may more properly be said to regard the Landlord, yet in general it is an Article of great Concern to the Farmer. He is to keep up the Fences, and this at a considerable Charge. We shall therefore in a great Part of this Portion of our Work, labour also for his Advantage.

The Benefit of inclosing is obvious: 'tis indeed so evident, that those who have for other Reasons



Reasons written against the Practice, have been oblig'd to allow it the greatest of all others, in the Improvement of particular Estates. We see on all Occasions, that it encreases the Rent of Land in a very important Manner, bringing it at once to three, four, and sometimes to ten Times its former Price.

Every particular Instance that I have ever seen or read of it, has join'd to enforce this general Account, for no Attempt in that Way can be named, that has not enrich'd the Owner. One would wonder, that a Thing so plainly beneficial, is not more universally practis'd.

Private Estates lie differently, and some contain more, some less of enclos'd, and of common Field Land. To judge of the Quantity enclos'd, and Quantity open, we are to look into the general. ENGLAND is suppos'd to contain more than forty Millions of Acres; and 'tis computed that about one third Part of our Land is open Field. Upon this Supposition, which probably is near the Truth, for 'tis hard to come at it exactly; the Rent of more than fourteen Millions of Acres of Land in this Kingdom, may be rais'd to three, four, or many more Times its Value, by this single Act of Inclosure.

This is a vast Account; and as almost every private Estate must be more or less concern'd in it, as a Part of the general Quantity, it becomes every Land Owner to consider it deeply, in Proportion as he happens to be more or less interested. If he can have a Method pointed out to him, this Way of trebling or more, the Rent of some considerable Part of his Estate without Injury to any Person, surely it is worth his while to make the Attempt: especially when it is so easy, and the Event so certain.

It has been said by some, that Inclosures in this general Sense, are against the Laws of God; and others have imagin'd they tend to oppress the poor; but these are Points that have been debated by many as their Importance demands. It has been made appear, that if every Acre of Land in this Kingdom were inclos'd, it would be for the Advantage of the poor as well as rich. However, let Humanity in this Case be the Guide to every particular Person; because what might upon the whole be a publick Benefit, may in some Cases be a private Crime.

Let every Land Owner who is about to inclose, consider what will be the Consequences in that particular Place: if it appear that many are to be injur'd by that which singly enriches him, let him decline the Undertaking: but these certainly are Circumstances that cannot often happen.



## CHAP. I.

### *Of the great Advantages of Inclosure.*

I Have observ'd, that every Land Owner is more or less concern'd in this great Article of Improvement by Inclosure, in Proportion as more or less of his Land lies open; and I am aware it will be objected by many, who see the Advantages of that Practice very plainly,

and have Land enough to improve by it, that in some Places the Soil is so bad, that it is not worth the Expence; and in others, that as the Lands have lain open from Time immemorial, the common People will not suffer it.

The Thing is of so much Consequence, that every Objection against it ought to be answer'd. Those which are made against the general Practice, have been already taken Notice of in the last Chapter; it is fit these should be consider'd as seriously, which regard every particular Attempt. Such a general Practice must be begun and carried on by Particulars; therefore they ought in all Respects to be satisfied where there is Ground to do it.

As to the first Objection, the Barrenness of the Ground: it is a very common and a very natural one: but all that is common and natural is not just. A great deal of Land is called barren, that would have a better Character under good Management. I will be bold to say from what I have seen, that nine-tenths of the Land in ENGLAND that is called so, and left waste at present, might be cultivated by industrious and intelligent Persons, with great Profit.

It has been said, in the Beginning of this Treatise, that every thing may be cultivated except naked Rock, and of that we have very little in this Kingdom. What has been there advanced is founded on Experience; and he who shall think it worth while to undertake the Improvement of the worst Soils heartily, and begin with Inclosure, will give his Descendants cause to bless those who set him on the Trial.

To encourage the Person who has barren Lands to attempt this, let us turn his Eye upon those Tracts of Sand which cover some Parts of SUFFOLK, and the Edge of NORFOLK; nothing that can be call'd a Soil, can be so barren as these, and yet they are cultivated, where People have Spirit and Resolution, to a very fair Advantage.

In some of these Places the Surface of the Ground is a naked loose Sand. There is no Mixture of Earth, or any thing else, to be seen in it; and no Weed, not so much as a Blade of Grass is to be found upon it for Miles together. In the open Places it is moveable, like the Sands of ARABIA, by the Winds; and is carried in great Quantities, like Waves of Water, before every hard Gale. No wonder nothing grows upon it; for this single Circumstance must prevent that entirely.

Nothing can be pretended to be more barren than this, except bare Rock; yet they find the Way to render it fertile. They sow Hay Seed upon it in a calm Day, and immediately cover this with Furze-Bushes, which they stake down upon it, to prevent their being blown off. The Covering not only keeps the Sand steady, but light as it is, it produces some Moisture, as there will be on all Ground that is cover'd. This softens the Seed, and it soon shoots. After a little Time the Roots spread, and intangle in their natural Way, and hold down both themselves and the Soil, till it is cover'd with a tolerable Sward, and fix'd from that Motion it had before.

This is done, and tolerable Pasture is produced out of the most absolute Waste. We propose



propose those Things which are done on such Occasions, not only for the Farmer's or Landowner's Imitation, but for his Improvement. From this the Owner may see that he needs not suppose any Part of his Estate barren, from this which is the worst Fault it possibly can have; and we shall shew how all others may be remedied, and how most of them are remedied in one Place or other.

He who undertakes the Study and Practice of Husbandry, upon the Plan of this Work, will not stop his Endeavours at what he has seen done by others. We have already acquainted him what may be done in the Improvement of Soils, and for what they are suited; upon these Principles he will turn the SUFFOLK Method to a much greater Account.

Let him who has such a Piece of Ground, begin with it as they do there, but let him not stop where they do. In the first Place, when he has thus cover'd the Sand with a Sward, let him enclose it with a thick Hedge, to prevent the Sand from the neighbouring Ground being driven upon his Crop, and burying it. He will thus secure what he has got, and make it a lasting Advantage.

Again let him consider, that when he has a Piece of sandy Ground enclosed, Grass is not the only Produce he may make it yield. Carrots thrive better in this, than any other Soil whatever; and Turneps will succeed in it very well.

Here are two Articles by which he may very well pay the Expence of his Inclosure, in a few Years, and all that Time be improving the Land. But that is not all.

We have shewn, in the preceeding Part of this Work, in what Manner sandy Soils, even the worst of them, are to be brought into a Condition to bear any Kind of Corn or any Crop whatsoever, to great Profit, and with great Certainty. Now what will improve and enrich a sandy Soil, which has some Mixture of Earth, will, in a fuller Use, give Fruitfulness to the bare Sand itself; this follows from the Nature of the Practice itself, which consists chiefly in adding such Matters as alter the very Nature of the Ground.

Now upon this Principle, as soon as the Land Owner has been at the Expence of an Inclosure upon the most barren Sand imaginable, let him not depend upon the Hay that it will yield, which is little, or upon the Pasturage it will afford to Cattle, which, though very sweet is also moderate in Quantity; nor let him fix himself to any one Growth.

Let him begin to improve it upon the Plan, and by the Methods, laid down in our first Book, and fifteenth Chapter, for the Improvement of a sandy Soil; and when he has by a careful Management brought it to the Condition of a better Ground, let him sow it in the usual Manner; and he will reap Wheat, Barley, Rye, Beans and Peas from it, to the Astonishment of his Neighbours, and perhaps to their Imitation.

This is not to be undertaken in such Places, but by beginning with Inclosure, the Expence of which will be something; but a few Crops will repay it; and the Land will be render'd valuable for ever.

If this may be done by the Assistance of Inclosures in the worst Soils, for none can be more barren than what has been here proposed for a Trial; it is very evident that upon a better Land, the Advantage will be greater. What was proposed here was to answer the Objection, That some Parts of an Estate may be barren, and not worth inclosing; which we hope is thus shewn to be altogether a Mistake. Certainly it is such, and every one who shall be induced to make the Trial, will find it beneficial.

Without Inclosures, this is in such Soils altogether impracticable; and indeed the Benefits of a perfect and expensive Dressing of Land, are never thoroughly assured to him who is at the Expences and Trouble, but in Lands that are inclosed. This theretore is a great and a reasonable Motive for extending the Practice.

As to the Opposition of the common People, which is the second Objection, that may also be answer'd with Truth and Candour. Where the inclosing will be a real Injury to the Poor, the Landlord has been already advis'd to let it alone; but this can happen only in a few Instances. In all others, where their Opposition arises from Obstinacy and Folly, let him guard against its Effects by setting out in a proper Manner.

Dry Hedges are easily laid flat, and Quicksets pulled up, and this He may always expect will be done who opposes Prejudice, let him therefore make his Fence by a Ditch seven Foot deep, and as many wide. They will be ready to throw the Earth into this again, and fill it up: 'tis true, but he may prevent that in Time, by spreading the Earth as it is thrown out upon his Land. This will serve as a Manure to the Soil, and though Passion might have led the Mob to throw in the Bank if it had been left, they will not be at the Pains of digging for that Purpose: they will not have Opportunities of doing this in secret, and they will not dare to do it openly.

Thus will the Effects of Malice be prevented; and the Benefit of the Expence and Labour assured to the Proprietor. They will very soon be repaid by the Produce; and if it so happen that Water can be got into the Ditch, the better. After a few Years, Things will be left quiet, for Custom will prevail one Way as well as another, and a Quick may be planted, which will thrive leisurely, and ensure all the Advantages of a regular Inclosure.

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## CHAP. II.

*Of the more particular Benefits of Inclosure; and the other Objections made against it.*

THE Improvements which have been mention'd in the preceeding Part of this Work, are very numerous, as well as great. The least and slightest of them will very well answer the Expence of the most costly Kind of Inclosure, in the Compass of a few Years; and there is no Kind of Land whatsoever, but will by means of Inclosure, be render'd capable of one or other of those Improvements.

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This is a certain and unquestionable Truth; and this at once sets the Business of Inclosure upon its proper Footing, shewing every Land Owner, in every Circumstance and Situation whatsoever, that it is to his Interest to inclose. Things plain in themselves become yet plainer by Instances; and every one of these that can be produced, will serve to strengthen the Cause in Favour of this Practice: it is a very bold Thing to advance, but it is as certainly a Truth, as said before, no Person ever set about Inclosure upon proper Knowledge, and with due Industry, who did not vastly profit by it.

This Practice not only makes Land yield greatly more; but it ensures to the Owner his Property and all its Advantages, as it prevents those innumerable Trespasses and Injuries which are continually happening in common Lands.

It gives a Man Liberty also of making whatsoever Alterations or Improvements he shall choose, upon his own Land; he may plant and sow what he pleases, and in whatever Manner he pleases, upon his Ground, when thus separated from the common Quantity; which he cannot do without a thousand Insults, Interruptions, and Inconveniences, from the Malice, Envy, or Folly of his Neighbours, while it lies open.

These are not imaginary Advantages: all Counties, and all Times, have allowed them. We read in the antient Books that mention Husbandry, of inclosing as the next Thing to plowing; often, in more improved Trimes, as prior to it: and in all known Countries, from the earliest Time to the present, inclosed Lands have been held more valuable than the open.

Beside the political Advantages of Inclosure, in ascertaining a Man's Property, and securing to him the Fruits of his Industry uninterrupted, there are several that may be called natural. I have already mentioned the Use of Hedges in those sandy Weilds of SUFFOLK, to keep off Loads of the loose Covering of the barren Parts, from overwhelming the fruitful: but in all Places, in the best as well as worst Counties, they are of great Service to the Crop, of whatsoever Kind. They defend the Crop from the Fury of the Winds, and, in a great Degree, from those cold and nipping Blasts which are so mischievous in the early Part of the Spring. An inclosed Piece of Land is always quieter and warmer than a Piece in an open Field of the same Soil and Condition. This is very obvious to Reason, and is confirmed by Experience.

Inclosure preserves, in a great Degree, the natural Heart of the Land, and that Richness which may be added to it by proper Manures. For it is found that the same Quantity of Manure will do twice the Service upon a quiet, warm, and sheltered Close, than it will upon an equal Quantity in an open Field, where it is liable to all Injuries. It is certain and well known, that an inclosed Land yields a much larger Crop of any Kind of Corn, from the same Seed and the same Dressing, than it will in an open Field: And as to the Grass for Pasturage or Hay, there is no Comparison between the Quantity growing on inclosed and common Lands. The Hedges also which make the Inclosure, if rightly managed,

as we shall direct at large in the succeeding Chapters, are, in themselves, a great Advantage and Profit. They serve for a Shelter to the Cattle that feed in those Fields; and they supply the Farmer with Wood for all his necessary Purposes; and may be made in many Places to yield also valuable Fruit.

These added to the many other Benefits arising from Enclosure, already mentioned, we may reasonably hope will lead all to a due Sense of the Importance of this great Article in the Improvement of Land. Nothing more is wanting, certainly, to convert the naked and starved Parts of WILTSHIRE, HAMPSHIRE, and some of our other Counties that might be named, into the same Condition with the most rich and improved Parts of BUCKINGHAMSHIRE, and HERTFORDSHIRE; and to make the common People of one as happy as those of the other. For whatever Pretences may be made of the Oppression of the Poor, by the enclosing of Lands, this is certain, that they nowhere are so happy as where the Land, in general, is under Inclosure, and nowhere so miserable, poor, ragged, and idle, as in those Places where most of the Land lies in common.

All was once open, and the civilizing of People, and improving Lands by Inclosure, here came together. Those who first settle in a Country find it all open. They, by Degrees, appropriate and inclose: and why should not that which is found so beneficial in the first Steps to improving a Country, be carried throughout every Part?

Certainly every Man would wish, and must naturally desire, to have that which is his own entirely his own: and this can only be by Inclosure. That Land cannot be perfectly a Man's own, which is not entirely in his Power. And that is not so in his Power which he cannot manage as he pleases, and cultivate when, how, and in what Manner he pleases. How can that be entirely a Man's own, where the Profits of his Labour and Expence are not assur'd to him; where every stray Beast from the Highways and Commons, may walk in and tread down his Crop: nor can that Land be said to be perfectly under his own Management, which he is obliged to sow and reap at the Time others do, whether he will or not; and to keep Time with them in all other Particulars, when he knows how, by another Conduct, to have greater Profits.

That what is urged here in Favour of Inclosure, is not from Fancy or Prejudice of Opinion, is evident from what we see daily of the Effects and Consequences of that Practice. We may easily direct our Eyes to Places where, in the Memory of ourselves or our Fathers, Inclosures have been made from the common Fields. Let us fairly examine together the Condition of what is inclosed, and what lies common. The Land is the same, an Hedge only parts it; yet we find universally, that the Crop is vastly greater in the Inclosure, than in the common Fields: nor can there be any Cavil justly rais'd against the Conclusion from this, by alledging, that more is bestowed, perhaps, in dressing the inclosed Piece of Ground. 'Tis plain, by Peoples continuing to dress it at such Expence, that the Profit answers. But the general and unanswerable Argument is, that



that such inclosed Lands are of more Value than equal Quantities upon the common Field. The Advantages of the Crop soon pay the Expence of making the Inclosure; and the Value of the Land is made much greater for ever. This is so plain an Argument that it admits no Dispute.

We see vast Quantities of Land lie open in many Places, where it is of very little Value: We have seen, from Time to Time, Parcels taken from this and inclosed, which, upon due Dressings, have, in a few Years, paid back all the Expence of Inclosing and Improvement. Can there be any Reason assign'd why this should not be done every where.

The Reasons that have been pretended against it are either false or frivolous. Many of them have no Foundation in Fact; and others which are true, and are a general Grievance, may be easily removed.

In the first Place, it is not true that the Poor would be injured by a general Inclosure of all common and waste Land. If there be particular Instances in which they would suffer, these should be particularly considered, and Amends made to the Sufferers. In general the Advantage that a poor Man has by keeping two or three sad Creatures of Cattle, of any Kind, upon the common Land, are not at all equal to what he and his Family would find, by being sure to know where to get constant Employment as Labourers. This Privilege is indeed a Source of Idleness: and that can never be for private nor publick Advantage.

Upon the Edges of all great Commons we see a miserable Set of Cottagers. Hunger is in their Faces, and Misery upon their Backs: they idle away their Time in tending their own and other People's Cattle; and breed their Children to this poor Employment. The Profits of this are not at all comparable to what they would have from the common Price of their Labour and their Childrens. And if these Lands were inclosed, they would be at once compelled to Industry; and always found in Employment.

The great Number of Claims and Titles for almost every Piece of common Field and waste Land in this Kingdom, is indeed likely to be always, as it has been often, an Hindrance to this great Improvement by Inclosure. Among these several People one Man is obstinate, and will not comply; another is under Age and cannot: These are real Objections, but they are easily removed.

Is what has been said upon this Subject true or false? certainly it is true! being true, is it not sufficient Proof of the general and universal Benefit of Inclosure? if so, why should not a Power be allowed to the Majority of Proprietors, by Parliament, as in other Cases, to which the few who are foolish and obstinate, must submit: and in virtue of which, a Liberty should be given to some to treat for Minors; and in all particular Cases Provision made for those who shall fairly shew themselves to be aggrieved.

This appears to be a reasonable Plan: and the Consequences of it are certain. They are a great Addition to the Value of Land; and a constant Employment for the Poor and Industrious. The Highways, which are at present so wide, in these

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open Fields, and destroy so large Quantity of the Land, might be reduced there as well as in other Places; and no Prejudice or Inconvenience to any could arise from it there, any more than elsewhere. A great deal of Land would be then recovered from the most needless Waste imaginable; and its Value would be made much greater by the same Practice.

It is not only certain that inclosing Land any way is an Advantage in every Place, but 'tis equally true, and is supported by the same Experience, that the smaller the Inclosures are severally made, the greater is the Improvement. This is conformable to Reason; for Inclosures of a large Extent are less sheltered by their Hedges, and have less of all the other Benefits of Inclosure, as they approach nearer to the Nature of common Fields; the Borders of all which are terminated by Hedges somewhere. And, on the contrary, the more of these Inclosures are made, and the smaller the Parcels of Land contained within them, in the greater Degree it has the Benefit of all that Practice; and, accordingly, the larger Returns it is constantly found to make, whether Corn or Pasturage.

The encreased Value of Land by this Practice, always keeps Pace exactly with these Advantages, the same Quantity of Land, upon the same Soil, will always let for a larger Sum if there be many, than it will if there be few Inclosures; that is, it will fetch the more Rent, the more Parcels it is divided into. Objections might be started against this general Account, from particular Instances, but they will be consider'd severally hereafter: this is said generally; and it has fewer Exceptions than almost any other general Rule; though, from its extensive Compass, it cannot but be liable to some.

In good Meadow Land there is sometimes a Loss by having too many Hedges, by the Quantity of Grass they spoil by their Shade, and their Drippings; but even this Disadvantage is owing to the Want of due Knowledge in the Art of Fencing. We shall shew hereafter, that even in these Cases, if proper Trees are planted, their Produce will be worth more than the Grass they injure.

Objections have also been started against Inclosure in Corn Lands, from that common Opinion that Wheat, in inclosed Lands, is more subject to Blasts and Mildew than in the open Fields. Of this we shall treat at large hereafter, when we come to speak of the Distemperatures of Corn. For the present it is sufficient to say, that these Accidents are not the Effects of Inclosure, although, perhaps, they are more frequent in Inclosures, than in open Fields. We shall, hereafter, shew their Nature and their Cause; and propose such Methods as, with due Observation, will not fail to preserve a Crop from them. In this Place it need only be farther said, that Wheat is always as liable to blast and mildew upon an open Field, as in an Inclosure, provided the Land be as rich. This is a certain Truth, confirm'd by abundant Experience; and as there are Methods of Prevention in each Case, there is not the least Justice in using this Accident as an Argument against Inclosure.

It is said also, That the Number of labour-  
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ing People is not sufficient for the dressing of all the Lands in the Kingdom, supposing they were all inclosed. Let this be fairly consider'd, for it has some Weight. 'Tis certain that the same Quantity of well-inclosed Land demands a great many more Workmen than when open. The Cause of this is seen in the Account given already of the Culture of inclosed and open Fields, the fallowing of one, the constant working often of the other; and the several other Differences that will be shewn in their proper Place. But this Article of inclosed Lands employing a greater Number of People, is one of the greatest Arguments in its Favour. As to there not being enough of them at present; all the Land of the Kingdom could not be inclosed at once; so they would not be all wanted at once. They would rise as the Occasion rose for them. At present all other Employments are over-burthen'd with Numbers. The Tradesmen starve from the Multitude in every Business: a better Application to Husbandry would take off these redundant Tradesmen, and would employ those Multitudes, who, because they cannot get Bread at their several Professions, rob and steal.

Here then are all the material Objections that have been made to the Inclosure of Lands, stated in their utmost Force; and every impartial Person will be able to judge, whether the Answers proposed against them be or be not satisfactory in the Eye of Reason.

The Farmer, or Land Owner, who is about to inclose, must know, that general Rules cannot suit all particular Cases; therefore he is not to go to work rashly, on seeing the Utility of the Plan, but to follow us, step by step, through this important Part of our Work; in which we shall shew him, that though all Inclosure is profitable in all Places, yet Inclosure of Meadow Land is one thing, and of Corn Land another; and impart to him the Reasons of this Difference; and the Conduct he is to follow.

With respect to the stale Objection, that there are Lands which cannot be inclosed, because Trees or Shrubs will not grow upon them, we shall shew him who makes it, in the Course of this Book, that Ignorance is oftener the Parent of this Excuse than Knowledge. That all Trees, or Shrubs, are not suited to all Soils, every Child knows: but there are some suited to almost every Kind, and these such as an ingenious Contrivance may work into Hedges. Where Trees will not thrive at all, there are other Kind of Fences to be made; and, in general, Nature, in those very Places where she denies Growth to the one, has made Provision of Materials for the other.

This is certain, Inclosure is always profitable; and there is no Kind of Land whatsoever, that may not be inclosed by some Fence or other, with Profit to the Undertaker. The best Methods of doing this will come next into Consideration: the suiting the Fence to the Land, and the making and preserving the several Kinds, will be treated at large in the following Chapters.

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### CHAP. III.

#### *Of the several Kinds of Fences.*

Whoever has a Piece of Land which he intends to inclose, must remember what has been said already, that every Kind of Ground will not admit of every Kind of Inclosure: but that there is no Land whatsoever that will not admit of some one or other, of the several Sorts of Fences needful to that Purpose.

When the Soil is too barren for the Growth of an Hedge, there is often Stone ready for the building of a Wall: and when it is too damp for the thriving of those Shrubs, which usually are planted for that Purpose, the very Water that denies Recourse to this common Method will fill Ditches, which will answer the Purpose.

The first Thing therefore is to examine the Nature, Soil, and Situation of the Ground that is to be inclosed. Here is choice enough of Ways to do it; but a prudent Election must be made among them: for a Mistake in the setting out will overthrow all the Expectation.

He who should plant Hawthorn in a Fenn, or dig Ditches on a sandy Hill, must be at once disappointed and laugh'd at. One will rot, and the other be fill'd up. Neither can at all answer the Purpose. But that is no Proof that Inclosure, properly conducted, would not have succeeded.

Not only Corn Lands, but Meadow and Pasture Ground of all Kinds and Denominations, fall within the Reach of this great Benefit of Inclosure. These last are principally distinguished by their Degree of Moisture. Those which lie low, and within the Reach of natural or artificial Overflows, are called wet Meadows or Pastures; and those which have a lighter Situation are called dry Meadows, or, more commonly, dry Pastures. Some confine the Term Meadows to the wet, and Pastures to the dry; but this is not the usual Sense of the Words. Beside these there is another Kind of Meadow, or Pasture Ground, which is damp or wet from its own Nature, not from the Accident of being overflowed, at Times, by Rivers, naturally or artificially. This, when it is the wettest of all, is what is commonly called Bog; but it is not all of that Kind.

These are the three great Differences of Meadow or Pasture Ground: and according to these those Lands are to be enclosed in several Manners: all will have great Benefit by Inclosures, but there will be vast Advantage in selecting the proper Kinds.

In the dry Pastures on an hilly Situation, Hedges are the proper Fences. They are of vast Service, beside their sheltering the Cattle, in that they defend the Grass from the Summer Heats, and shelter it in the Spring from the drying Winds, that, in open Places, nip it while it is young and tender. For this Reason, the smaller the Inclosures are in dry Soils, and on hilly Situations, the better the Pasture thrives. This may be seen abundantly in all the hilly Pastures of our improved Counties. All is fresh in these small Closets, while the Grass is poor, spare-



ing, and burnt up in the opener Pastures. The Hedges also, when well form'd, are of Value for their Produce in needful Wood: and Timber or Fruit Trees grow well in them in most Places.

The wet Meadow requires Choice in the Shrubs that form the Hedge, and such as are proper thrive so fast, that the Profit arising from them is very considerable: in these the Inclosures need not be so small; for lying low, and being well water'd, they are better defended in their own Nature both against the Winds and Sun.

For the last or wettest Kind of Pasture Land, Ditches stand in the Place of Hedges. They easily fill with Water, and are a very safe Fence. Beside that, if well contrived, they at the same Time that they inclose, assist greatly in draining the Land. Of this we shall treat particularly in its Place.

Thus we see that a proper Regard being had to the Nature and Situation of the Ground, Fences may always be had best of one Kind or other. The Quickset Hedge will thrive in many Places, where few imagine, but this requires a Degree of Knowledge with which the Generality of Husbandmen are not acquainted, but which we shall endeavour to convey to them in the plainest and most familiar Manner. In Places where the Hawthorn will not thrive, or indeed live, there are other Shrubs that will succeed very well, and make a good Fence. Where nothing of this Kind can be used, the Earth will yield Stone for Walls, which may be built at a small Expence; or it abounds with Water for Ditches: and where none of all these can be had, Banks of Earth may supply the Place, and answer the full Purpose. The Person who is inclined to inclose, can never therefore be at a Loss for a Fence, provided he sets out with a competent Knowledge in the Nature of the Undertaking. We shall endeavour in the succeeding Chapters, to give him the Rudiments of this Knowledge; and to inform him severally of the proper Fences for all Kinds of Ground; and of the best Methods of making and preserving each.

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#### CHAP. IV.

##### *Of Ditches, and their Use in fencing.*

HAVING enumerated the several Sorts of Fences, and the Lands to which they are most naturally suited in their different Kinds, we come to the more particular Consideration of each; and to their Use; and the Manner of making and preserving them. In this Design we naturally begin with Ditches, as they are the most cheap and easy: and as they lead not only in some Respect to the making the others; but also to that very considerable Article, the draining of Land, which falls as naturally as it does properly, under Consideration afterwards. From these we shall advance to the more complex and difficult Kinds made of Quicksets: this naturally leading us to the Plantation of Trees in those Hedges, and their Plantation to that of Coppice and Forest Trees, in the regular Course of our Work.

Fencing by Ditches is the least expensive of all the Kinds, the soonest made, and the easiest to keep in Repair: but then it is only to be done in marsh or wet Land, or in the wettest Kind of Meadow or Pasture Land before mention'd. The Incloser, who has Ground where there is Plenty of Water, cannot so well use any other Kind: but let him be sure that this is the Condition of the Land; for he who should dig his Ditches, and not have Water for them, would throw away a great deal of Expence, and make a very foolish Figure in the Eye of his Neighbours.

To know whether a Piece of Ground is fit for this Kind of Fence, the Owner must examine not only whether it be wet and damp, for that many Lands are at certain Seasons of the Year, or occasionally by Accident; but whether it be naturally and constantly so at a due Depth. Let him examine from what Source its Wetness arises, and whether this be continual; or be of such a Kind as will afford a sufficient Supply of Water for the filling his Ditches.

If his Neighbours have Ditches by way of Fence, let him examine into their State and Condition. First let him see whether they answer their Purposes. If he finds they do not, let him consider why: if they do, let him see whether they are likely upon an impartial Survey of the whole, to answer his Purpose in the same Manner.

If Ditches have been used Time immemorial in the Neighbourhood, and yet do not succeed so well as might be wish'd: let him enquire whether the Failure be owing to Nature or Neglect. Whether they have not been dug too shallow; and whether they do not fill up by Weeds, or by the Swelling of the Soil; which in very boggy Ground is frequently the Case.

If it appear upon the whole, that their imperfect Success is owing to any natural Cause, let him not attempt the same Kind of Fence upon his own Ground, for this is a Point in which Nature will not be conquer'd. If there be not a Supply of Water, all his Art cannot in these Cases bring it.

On the other hand, if he find their bad Success is owing to ill Management, let him learn even from their Errors, and by avoiding them in his own Work, assure himself of that Success which Nature allows. If the Fault be in the digging them too narrow, or too shallow, let him make his broader and deeper; if in the preserving them, let his Care be doubled. Did theirs succeed at first, but afterwards fail when choaked up with Weeds? let his be kept as clean always as at first: and in the same Manner let him avoid the other Errors.

If he find the Ditches succeed well on his Neighbours Land, let him, before he sets to work, examine strictly whether his own Ground be of the same Kind: for often Fields that lie very near, differ very greatly. The Fen Lands in LINCOLNSHIRE, NORTHAMPTONSHIRE, and the Isle of ELY, terminate abruptly. Ditches are the only Fence they have in many Places on these Lands, but he would be strangely foolish who should attempt the same Fence when out of their District, though ever so close upon the  
Edge



Edge of it. No more than a careful Observation is necessary, however, to determine this; for, though the two Lands lie ever so close, the Difference between them is palpable.

If there be no Ditches made by way of Fence in the Neighbourhood, and yet the Land seems by its Likeness in Soil and Situation, to those where they are used, to be fit for them, let him examine carefully where Holes have been dug by Accident, or with other Design, whether Water comes into them, and remains in them. If he find it comes in naturally and freely, and remains there tolerably well, let him set the Example by a fair, though not large Trial; and if it succeeds, he will both continue it himself, and lead others to imitate it in larger Works.

When the Land lies flat, when it is wet below, and the Water that stands any where upon it, becomes foul and reddish; when the Soil is black and mellow, and in many Places shakes or moves under the Feet in walking, there is generally Water for Ditches, and these are the Fence Nature points out; for there is neither Stone in the Ground for Walls, neither has the Earth a Firmness for Banks, neither will a Quickset grow there. Nature in these Cases points out to the Incloser what he is to do, for she leaves only one Thing that he can do. He is to dig those Fences which he can neither raise nor build; and there are sufficient Advantages in this Practice: For beside the Cheapness of the Work, the Soil cutting very easy, what is thrown up is of Use; sometimes more, sometimes less, according to its Nature.

In large Commons these Ditches run into one another; or all the lesser into one larger, which at length communicates with some other Water; but in this Case the Water is apt to grow very foul, in the lesser Ditches especially. The happiest Situation is where every Ditch can be carried strait down to some River. There the Water is more constant, and is always sweet. These may be bank'd upon Occasion with their own Earth; and if there be any Danger of the Cattle from one Pasture, getting into another by wading over the Mouth of the Ditch, no more is necessary than the running a Rail along on each Side into the River, to a certain Depth, and they will never attempt to swim round it. This is the Practice all along the River NEN in NORTHAMPTONSHIRE, and succeeds perfectly.

In Marsh Land in general this Sort of Fence does as well as any; and in many Cases it is greatly preferable to any other. About six Foot is a proper Width for these Ditches, and they should be about seven in depth, that there may stand four or five Foot Water in them usually; that in Droughts there may always remain some, and that they may hold two or three Foot perpendicular more in Overflowings, without running over upon the Land. By this Means they will serve as a good Fence at all Times, and not be liable to Accidents from small Occasions.

When a Fence of this Kind is made, a little Care will preserve it, but that Care must be used, otherwise it becomes presently over-grown

and useless; or what is as bad, the Weeds cover it so thick, that Cattle attempting to walk over fall in, and are not able of themselves to get out again. This is a common Accident on the careless Peoples Grounds in the Isle of ELY, but it very seldom happens where Things are better regulated. Weeds are very apt to grow in these still Waters; and the Soil is so soft, that the Banks and Edges of the Ditch are easily broke, and spoil'd: but in the very worst of these Places, when the Ditches are properly clean'd, this Accident scarce ever happens. When the Water is tolerably clean, and the Bank strait and steep, there is hardly any such Thing to be heard of as Cattle falling in.

These Fences do not answer the Purpose of a Hedge in defending the Grass from the scorching Sun, or parching Winds; but then the Moisture of the Earth in all these Places where such Fences are proper, or but practicable, answers the same Purpose, and renders such Defence unnecessary. And at the Time as this Moisture is naturally too abundant in such Grounds, the same Ditch which serves for a Fence, answers in some Degree the Purpose of a Drain. I have observ'd, that the Water is to stand in the Ditch two or three Foot below the Surface, and in this Case, which is commonly about the Mark, the uppermost two Foot of the Earth is drain'd in a great Measure by it, and this Depth takes in all the Soil; all that has any Thing to do with the Growth.

This is a very important Circumstance, and Experience confirms it. It will be explain'd more at large in the next Chapter, which treats of Draining; but 'tis certain thus far, that so much Good is to be done in many Situations by the Ditch fencing alone, that the same Ground which lying open is wet and shakes under the Feet, and receives their Impression when one treads upon it, will upon the dividing it by a good Number of Ditches, be render'd firm and sound; and its Product in all Respects better. This shews that in dividing and inclosing Land by Ditches as well as Hedges, the smaller the Inclosures are generally made, the better.

The Earth that is thrown up in digging of these Ditches, is a very considerable Quantity, and according to its Nature, or the Circumstance of the Place serves different Purposes. Sometimes the whole, and sometimes a part is requir'd for banking at the Edge of the Ditch itself. The Earth itself is sometimes entire fine Mould, and not unfrequently in these wet Lands, it is either a true Peat, at some little Depth, or is so intermixed with Roots, that it will make a Kind of Peat at the Surface. In LINCOLNSHIRE they cut it for this Purpose into proper Pieces, whether it be of the better or worse Kind; and burn it either alone or with dry'd Cow Dung: and the fine black Mould that is dug up is excellent to mix with Dung for the manuring of the dry Corn Lands.





CHAP. V.

*Of Draining in general.*

FROM the Consideration of fencing by Ditches, we are naturally led to that of draining, as it is a Practice used on the same Kind of Lands, and has its Foundation in the same Course.

The Lands which have Occasion for draining, are always such as admit no other Fence but that by Ditching, for they are too wet for Quickset Hedges, and too soft to bear the Weight of Walls; so that nothing rais'd upon the Surface can answer the Purpose.

These Lands are of two Kinds, their Difference arising principally from their Situation: the one Sort lie between Hills, or upon some Level on their Sides, or even on their Tops in some Places. These are called by way of Distinction, Bogs, or boggy Lands: the others lie in a Flat, and often extend upon an exact Level for a vast many Miles. These are called Fens and fenny Lands. Such as those in the Isle of ELY, LINCOLNSHIRE, and elsewhere.

This is the general Distinction establish'd by Custom; and thus we are used to call them, though if the Word Bogs and boggy mean only wet and soft, as many use them, they are as applicable to many Parts of the Fens, as to the hilly Quagmires, many of these Fens being as tender and soft, and shaking under the Foot as much to the full as what are more particularly called Bogs upon the Hills, or between them.

There is some Difference in the Ways of draining these variously situated wet Lands, and to this is owing the Difference of their Denomination. In this Distinction the boggy Lands have an Advantage over the fenny, in that they have a greater Descent to drain them; and thence principally arises the Difference in the Methods of proceeding: on the contrary, the fenny Lands have this other Advantage, that in general they are less wet, and less rotten, than those Bogs especially which lie between Hills.

To understand upon what Foundation the Draining of these Lands is establish'd, it will be necessary to know from what the Mischief arises: or how they become so wet and soft within, that they are render'd unfit for all the Uses of Agriculture.

Bogs are made by Springs, which rise at some Depth under the Surface in those Places. Hills naturally give rise to Springs, and when these issuing from some Depth, meet with a Weight of Earth that pens them in, they spread under the Surface where the Soil is soft, and they moisten and rot it, till it becomes a Quagmire underneath, cover'd only by a Turf at the Top, which sinks as it is trod upon, rising in some other Place, and is continually in a trembling Motion.

Fen Lands on the contrary, lie on Flats, are nearly upon the Level with the Water of Rivers that run near them, and are subject to be overflowed by the Swelling of those Rivers.

When this happens, they lie so flat that the Water cannot get off; and hence arises the Necessity of draining them. There are some Fen Lands that are constantly and continually wet, not accidentally from those Overflowings. These approach more to the Nature of the Bogs; and the Method of draining them is to be accordingly contrived, partly from that for Bogs, and partly from the other.



CHAP. VI.

*Of draining boggy Lands.*

THE first Thing to be done where a Piece of boggy Ground is to be drain'd, is to examine it well in order to find the lowest Part; and to observe what Descent there is. When this is found, a Drain is to be open'd, and it must be cut through the Ground to such a Depth, that its Bottom be at least a Foot below the Level of the Springs. When this is done, the Water from the whole adjacent Ground naturally drains into the Cut; and there, provided a free Passage be kept open, it runs off.

From what has been said before of the Nature of the boggy Land, it is plain that this single Operation, provided it be judiciously design'd, and properly perform'd, must effect a Cure. We have seen the Cause of this Boggyness is, that the Water of certain Springs is damm'd up, or pent in by Earth; a Passage is here given, and consequently the very Cause of the Evil is removed. The Water that swelled and soaked the Ground, because it could not get off, has now a Passage by which it runs away freely and continually; and the Ground which was made a Quagmire by its being before pent in, becomes dry enough to be useful.

The great Caution to be observ'd in this Particular is, that the Drain be cut deep enough: for if it be not deeper than the Bottom of the Springs, the Remedy will be imperfect. There will still be a Lodgment of Water at the Bottom of the Bog, the Drain carrying off only what is above the Level of its Bottom; and it is surprising to see how much Mischief a little Wet at the Bottom of a Land, that has been us'd to be boggy, will do.

The Depth is so uncertain, there is no giving any general Rule for it: but some guess may be made from the Nature of the Ground, and its Situation. The Way appears greater to the Spring than it naturally is, because the boggy Land is rais'd and swelled up beyond its proper Surface, by the Force of the Water that is confin'd in it; infomuch that in a Bog well drain'd, it will often sink two, three, or four Foot from what was the Height while wet.

The Depth at which the Springs lie, is always greater according to the Weight of Earth that pens them in: but he who sets about this with Discretion and Judgment, will know whereabouts it will fall, from his Observations; and he must have Resolution to go through what he has undertaken, for all will be sure Profit in the End.



The Drain must be begun in the lowest Place, and carried into the Bog towards the Spring Head; and Trenches are then to be cut across, at proper Distances; by Means of which every Part of it will be drain'd thoroughly, and perfectly.

The Breadth of the Drain must be proportioned to the Depth; and this the judicious Undertaker will easily contrive, for, by the before-named Observations, he will be able to guess very nearly at the necessary Depth of the Drain, before he begins the Work.

Some farther Cautions are necessary to be given in this general Account of draining Bogs, for the securing and keeping the Advantage perpetual, and avoiding Inconveniences.

When small and shallow Drains are sufficient, as is often the Case, particularly in some of the rushy Bogs, they may be left open; and no farther Care is necessary than to look at them now and then, to see they are kept from filling up. But when they are broader and deeper, some Precaution is necessary to prevent Accidents.

As has been directed in the cutting of Ditches, by Way of Fence, the Earth that is thrown out must never be left upon the Edges of these small and shallow Drains, as is too frequent a Practice. If it will serve to neither of the Purposes there mentioned, of Firing or Manure, it must be carried off, to be thrown away; but generally it is a Kind of turfy Matter, and will make a coarse Sort of Fuel.

When the Drain is wide and deep, as there is no Necessity for keeping it open at Top, 'tis best to cover it up to prevent Cattle tumbling in. In this Case a good Quantity of rough Stones must be thrown in: they should be such as are hard, and will not settle too close, but leave a free Passage for the Water among them. Upon these is to be laid refuse Wood, and over that some of the Earth that was thrown out in digging. By this Means a thorough Passage will be left free for all the Water the Springs yield, and there will be none of these frightful Openings upon the Surface. Care must be taken to keep the Trenches clean; and then this main Drain will keep in order for Ages, and preserve the recovered Land from growing wet again.

This is the common Practice in the draining of boggy Lands, explained in all its Branches, and shewn to be founded upon a real Knowledge in the Cause of the Dampness of such Lands; but it is not our Intention to leave the practical Husbandman, with only the common and general Rules to guide him. Experience has shewn, that the best general Methods admit of Improvement in particular Instances; and we shall shew him how he may take a different Course from the common; in some Cases to a greater Advantage.

Though in many Places the Trenches running to the main Drain, will keep clean and open of themselves, if the Earth thrown up out of them be removed; yet in some Bogs the Earth naturally swells in such a Manner, that they will fill up of themselves, though cut to a considerable Depth, from their Bottoms rising, and their Sides pushing towards one another.

I have seen in LANCAIRE such strong Instances of this, that one might trace the old

Trenches over the Surface of the Bog, not in Hollows, but in a Kind of rough Seams, as it were, rais'd up above the Rest of the Surface; as the Letters and Figures carv'd in the famous Grotto of Antiparos, not only fill up in Time, by the swelling of the Stone, but project beyond the Level.

In these Cases the Bog always remains a Bog still. The Expence has been thrown away, and the Attempt of draining given over: if such discouraging Circumstances should cross our Undertaker, 'tis fit he should know how to guard against them: for that is to be done, and there is no Need of giving up the Design.

In this Case he is to treat his Trenches in some Degree as he does his wide and deep Drain, keeping them from filling up of themselves, by throwing in something between that will preserve an Opening for the Water, and yet keep the Sides asunder.

The best Method of doing this is as follows. In the first Place, let the Trenches be cut somewhat deeper than otherwise they would need to be, suppose, for Instance, three Foot deep, and two Foot over. Then, as soon as they are made, let the Bottoms of them be cover'd with fresh cut black Thorn Bushes: upon these let him throw in a Quantity of large refuse Stones: over these let there be another Covering of black Thorn Bushes, then a Covering of Straw; and upon this some of the Earth, so as to make the Surface level with the rest. These Trenches will always keep open, and their Advantages will be found in every Inch of the Land.

In this we are only bringing the Experience of one Part of the Kingdom to the Assistance of the others: we are only laying before the Husbandman of LANCAIRE, the Practice of the Drainer in OXFORDSHIRE, for this is a well known thing there, and has been continued from Father to Son these many Generations.

Nothing is more easy nor more familiar to Reason; nor is there any boggy Piece of Land where the large Drain can be made effectually, that will not be perfectly cur'd by this Practice. Yet so little ready are the Husbandmen, in general, to make use of their Reason against cross Accidents, or to enquire into the Practice of others, that, at this Hour, many Pieces of boggy Ground may be seen in the County before-cited, with the Trenches all grown up, as just mentioned, and with a deep dirty Drain half full of Rubbish, which might every one have been thoroughly and perfectly cur'd, by this single and slight Expedient. So easy is it to throw away Money to no Purpose upon the most rational Design; and to give up what is practicable.

In STAFFORDSHIRE, instead of black Thorn Bushes, they make the first Lay of a Quantity of fresh Heath, and then put the Stones, covering them with a good Coat of more Heath, and then with Earth. This is a better Method where Heath is to be had; and that it commonly is in the Neighbourhood of Bogs, for it is tougher and more durable in the Wet than the other; and at the same Time, though it lies closer a great deal, yet there is something so stubbed in the large Shoots, that they will not be press'd entirely flat.



It is certain, that the worst boggy Lands that lie upon or between Hills, may be drain'd by this single Method: which is easy, cheap, and not liable to failure by Accidents, if properly conducted: and it is equally certain, that the Value of the recover'd Lands is very great, for they become fit for a Variety of Purposes, as shall be shewn hereafter.

Let not their Appearance, while in a Bog, dishearten the Undertaker; for their Produce, when reduced by draining, to firm Land, will be altogether different from that which naturally grows upon them while wet; and this Improvement may also be promoted by Art: but before we speak of that, it may not be improper to give one farther Method of making the necessary Drains, in such boggy Ground as is soft and mellow, and but moderately wet.

For this Purpose several Holes are to be dug in a strait Line along the Bog, at about eight Foot Distance; these are to be about seven Foot deep, and four Foot wide. A Man is to get into one of these as soon as it is dug, and to work away toward the next, each Way, leaving a Coat of Earth of about three Foot thick at the Top. Thus he is to proceed in each Hole, till, by this Means, the several Burrows meet, and there is a subterranean Drain made through the whole Bog.

Brush-wood, or any usefess Materials of a like Kind, are to be thrust into the Drain everywhere, to keep it open, and thus the Water will be carry'd off with great Certainty, and the Bog will be left dry and firm Land. This Method was first invented near WEEFORD in STAFFORDSHIRE, and is at this Time practised in many of the neighbouring Places with a lasting Success.

When a Piece of Ground is thus recover'd from its boggy State, it will still be found unfruitful. Its natural Product in this wet Condition was Moss, and it will continue to yield Nourishment to that, and, till assisted by Art, to little else, because all its Juices will be exhausted by that usefess Production. To cure this Fault, it is to be dress'd with Ashes, kept dry, as before directed, in the Chapter on that Subject, in our Second Book. These are to be spread over it, at the Rate of thirty Bushels to an Acre; and they will act very effectually, in destroying the Moss, and in enriching the Soil for better Products.

#### C H A P. VII.

##### *Of the Draining of Fenny Lands.*

**I**N treating of Fen Lands we are to distinguish, as before hinted, such as are naturally wet at the Bottom; and such as become wet by the Overflowings of Rivers, from Land Floods, or other Accidents; for a different Method is to be taken in these distinct Cases. In one, nothing is to be done but the carrying off a Quantity of Water that has fallen upon them by Chance, and stagnates there, because of this flat and level Situation: in the other, or those naturally and continually wet, all is to be done that is requisite in the draining of Bogs, of which they are a Kind;

and often the most difficult of all to drain, because of their flat Situation.

As to those Fen Lands which are only overflowed at Times, and have a good Soil, if the Water could be carried off at Pleasure it would be an Advantage, and not a Detriment, provided it fell on at proper Times; for it would only answer that useful Practice, the drowning of Meadows. The Soil of these Fens is, indeed, generally good: but the Water does not always come on so regularly as it might be wish'd, nor is it to be got away without Labour and Expence: a great Part of it usually remaining till the Sun and Wind carry it off. This is much too long for it to lie profitably on the Land, and hence arises that Injury which such Fen Lands suffer, and the Advantage of draining them.

If the Water can be compleatly carry'd off from the Surface of these, 'tis all that is requir'd; but in the other Case, were the upper Part of the Soil ever so well drain'd, the Source of the Wet being within its own Bowels, the Mischief would return, unless that had a Way made for it; which can only be done upon the true Principles of draining, as laid down in the former Chapter: the finding the Descent, and cutting Trenches to a proper Depth. In general also this is the best Way with those which are only subject to occasional Overflowings; for when these have happened often, and the Water has been used to lie a great while upon them, they are soak'd down to a great Depth, and have acquired, by Habit of Wetness, much the same Qualities with the naturally boggy Grounds. Indeed, the carrying off the Water lodg'd on them, by Land Floods or heavy Rains, is only a superficial and partial Cure: the draining them to the Depth, though it may be a more expensive, is a much more perfect Remedy: nor is the other ever to be done perfectly, by all the Contrivances that have been made. The best they do is to get off a great deal of the Water, and leave the less for the Sun to dry up; for they never drain them entirely.

The judicious Undertaker will, to each Kind of Land, if it be of any Extent, use both these Methods; for by first throwing off the superficial Water, he will be able to carry on his Works for a deep and thorough Draining, with much greater Ease and Success.

This superficial Water may be carry'd off by Engines, when in very great Quantities, with little Expence: the Sight therefore of a Sea upon the Fen, at certain Seasons, need not discourage the Undertaker from his Attempt. I have seen many Fen Lands of great Extent, that have been a perfect Lake to Appearance for some Time while overflowed; but, by Degrees, a good Part of this has run off, and the Remainder, which has lain and render'd the Ground usefess, might have been carry'd away by the most common Engines. But the Negligence in this Case is surprizing. We propose here to inform the Farmer how he may make an effectual Cure; not only preventing the Effects of his Neighbour's Neglect, but rendering the Land safe for ever, from either its own Wetness, or such Accidents.

This compleat Remedy and Preservation is to be effected by three Things, supposing the Land both wet in itself, and liable to Overflowings.

These



These are, first, the taking off the Water lodg'd on the Land, at present, by Floods; secondly, the draining it of what rises from its own Bottom; and, thirdly, the preventing its being overflowed from the Land Floods and Rains for the future.

For the first Purpose, or carrying off the Water that has been brought on and left there, by Land Floods, many Engines have been contrived, and are, at this Time, used in different Places; but none answers better than the Sail Wheel, which they call, by way of Eminence, in the Isle of Ely, the Engine. This is composed of about a dozen Spokes, fashion'd according to the particular Purpose, and is turn'd by Sails like those of a common Windmill.

This Engine will carry Water excellently either off a Flat or where there is some Rise; but for this different Use there is to be some Variation in the Make of it. When 'tis only to push the Wet along a Flat, for the getting it off, the Spokes are made broad, and set a little sloping. And 'tis amazing how vast a Quantity of Water it will thus throw off in a Day's Time, the Spokes all moving between a couple of upright Boards, which make a kind of Trench for them to play through.

When the Water is to be rais'd to any little Height, in order to be carried off, the Spokes are made hollow like so many Scoops; and they are set so as to deliver the Water just at that Pitch, which they do incessantly, and with great Regularity.

Lastly, if the Water be to be thrown out at a larger Height, as over a Bank, or an Eminence of the Ground; the Spokes are for this Purpose, made in the Fashion of so many Boxes, which do not throw the Water out before them, but take it up, and retain it; letting it, as they rise, run into an hollow Circle that goes round the Spokes, at about half their Length, whence it is discharg'd again from the Back of the Spokes as the Wheel descends.

Thus is this Engine suited to all the common Purposes of Draining: and kept up in Repair at a small Expence: so that the Farmer is right to prefer it to many of the more complicated Machines that have been propos'd, with Promise of Miracles from their Inventor, but with much less real Advantage than is every Day found from this plain and common Wheel.

When the Water of the Land Floods is thus carry'd off, the Undertaker is to set about to remove that which rises in the Land from its own Bottom. This he will do with Ease enough, now that the accidental Load is taken away; whereas, otherwise, there would have been endless Interruption of his Works, and Mistakes about the Springs.

He is now to act exactly upon the same Principle as in draining of the Bog, only as the Compass of Ground in the fenny Lands is often greater, the Works of every Kind must generally be larger.

A main Drain is first to be cut; and this must be done with the utmost Care and Contrivance, for upon this the Success of the Undertaking depends. The Situation of the whole Land to be drained, must be consider'd for this Purpose.

And this main Drain must then be cut deep enough to carry off the Water from the whole Level, at the Depth from whence it is found to arise: This is often not more than a Foot or two below the Surface in the lowest Places.

The Breadth of this Drain must be proportion'd to its Width; nor need the Undertaker be under any Concern on this Head: for supposing all to be absolute Refuse that is thrown out, the Benefit arising to the Land will very well pay the Expence: but often it is of Use, as has been observed already.

The Depth and With of this main Drain being determin'd, its Course is the next Thing to be consider'd. And for this little Advice will be sufficient, for it is to be carried from the lowest Part, as its Bottom, to the necessary Part of the Ground.

As to its Form, it must be widest at the Mouth, or Opening, and must grow narrower all the Way to its Head.

If the Compass, or the Situation, or other Circumstances of the Ground require it, there may be more of these main Drains: and there must be so, where it is plain, as often appears at Sight, that one cannot answer the Purpose. In this Case they are all to be made exactly as the single one already described; to be carried in a strait Course; to be of a sufficient Depth; and to be widest at their Mouths, and narrowest at the Head.

When the main or middle Drain is finish'd, it will be needful to open a great Number of other lesser Drains; though, in these large Works, they are generally too big to be called by the Name of Trenches. These must be cut upon the same Principle with the great one, narrowest at the Head, and widest at the Mouth; and of a proportioned Depth.

These smaller Drains are to be brought from every Part of the Work; and to be carried strait into the great Drain, at the nearest Parts.

All being thus prepared, the Effect will immediately follow, and will be such as is not to be conceived by those who have not been accusom'd to these Undertakings. The Ground which has been left soft and pappy, from the Water just carry'd off; and which is shaking at every Step in the lower Places, from its own natural Wetness, will, by the continual running off of the Water, become dry and solid. It will sink a Foot or more throughout, if it have been naturally very boggy; and it will remain fast under the Feet without shaking, and bear Carriages. I have seen Lands, on which a Horse's Foot would break through the Turf, and he would be let in up to the Belly, become hard enough for a Waggon in a little Time by this Method: and such as would swell and rise, and dance under a Man's Foot like weak Ice, bear a Coach over them without Motion; in short, by Degrees, the wettest and boggiest fen Land will thus be brought to a Consistence for every Sort of Culture.

When this good Effect has been obtained from the Drains, the Undertaker's Care is not to stop: for though, with proper Caution, the Ground thus recover'd will keep good for ever; yet, with Neglect, it will soon relapse into exactly its old Condition.



To prevent this, in the first Place, Care must be taken to keep the Drains clear, and of their due Extent and Depth at all Times. Twice a Year, that is, in the Beginning of OCTOBER, and about the End of APRIL, they must be thoroughly cleansed from Weeds, Mud, and other Foulnesses, that gather very fast in them, and when they are neglected, soon choak them up, and return all into the old Condition.

But beside this, Care is to be taken also, to prevent the Mischief of Floods, acting upon the Land as formerly. 'Tis true that the Water brought on by those, could not remain upon the Ground as it used to do, because of the Service of these Drains, but then it would in running off, tear and destroy all the Works; and beside the immediate Mischief it would always occasion, would entail an endless Expence upon the Undertaker.

To guard against this, let him examine well in what Place, and from what Source these Waters came on. If the Inundation happen from the Overflowing of a River, the Business is to bank in that River in a proper Place, leaving it ample Scope for its Course, but just keeping it off the Ground. If it happen immediately from the high Lands, Care is to be taken to give it a Vent into the next River, to prevent its falling upon the Lands: this Work will require in some Places more, and in some less Expence. In some Situations it is impracticable, and then the Drains must be trusted to: but where it can be done within any moderate Price, it is always worth while; for the Recovery of so much Land under a Certainty of its continuing good for ever, is an Article of prodigious Importance.

Different Fen Lands lie under different Degrees of the Inconvenience of being drown'd, and in some the Remedy is easy, in others more difficult, in some utterly impracticable, within such an Expence as the Advantage would repay. Where all the Sources of Boggyness and Wetness concur, the Methods already describ'd are all to be used; where only a Part, there Part of the Remedies is sufficient. We have in this Consideration taken it at the very worst; and the Undertaker sees all he can have to do in order to carry off the accidental Load of Water, to drain away the in-bred Quantity, and to keep the Land dry, that he has thus recovered from its useless State: he is happier where less of the Sources of the Mischief concur, that he may reap all the Advantages at less Expence.

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#### C H A P. VIII.

##### *Of draining flat Lands near great Rivers.*

**T**HE Borders of large Rivers near where they run into the Sea, afford often a peculiar Kind of Lands that require draining. These lie within the Reach of Tides, which rise high in such Places, and being also liable to the Effects of Land Floods, no Grounds whatsoever are subject to receive so large a Quantity of Water: but then none are so easily freed from it, or at so small Expence.

Numb. X.

These Lands lie above the low Water Mark, and below the high Water Mark; there are many of them along the Side of the THAMES, where at one Time they were waste and neglected, but at present are drain'd, and are very valuable. All large Rivers where the Tides run high, are border'd in many Places with such Grounds: and beside the Tide at its Times, they usually receive Land Floods, and give them into the River by a Creek.

These Lands have by some been confounded with Salt Marshes (of which we shall speak hereafter) but very improperly: they have great Advantages over them, in that they afford fresh Water which the Marshes naturally want; and Shelter for the Cattle, in which they are usually as deficient. They have often all the Requisites for being excellent Land, and only stand in Need of being drain'd and defended from fresh Overflowings.

Whosoever shall have such a Piece of Land in his Hands, and has the Prudence to intend rendering it serviceable, is freed from the Labour and Expence of Drains, for the Creek form'd by the fresh Waters for themselves, answers that Purpose. He is only to manage the Outlet of this rightly, and to defend it by a Bank.

The first Work to be undertaken is, the Bank: this is to be carried all along the Edge of the Land to the River, only leaving the Opening of the Creek for the present; for should that be block'd up, the Land would be drown'd by the fresh Waters, which would have no Passage: and yet if it were left thus entirely open, the Tide forcing itself up at its Rise, would overflow the Lands as usual, and burrow its Channel deeper.

Therefore when the Bank is all made, and firm, the Creek is to be stop'd up at once by a Number of stout Workmen, with good Materials, who are to make a very thick and strong Head to it, only laying in three or four long Troughs of Wood, which are to reach quite through the Head into the fresh Water of the Creek, and to open into the River. These Troughs are to be made each of four rough Planks, and are to be open at the End next the Creek; but at the End that comes to the River, they are to have each a Door that flaps to, when the River Water bears upon them, but that opening out-wards gives Way freely to the Land Flood.

When these Troughs are laid in, the Bank is to be carried on over this Head, and all is done. The Doors, opening out-ward, give Way to the Water of the Creek, which runs out freely all the Time the Tide is down; and when that rises, instead of forcing in, it only shuts the Doors of the Troughs. So that the whole Inconvenience is, that none of the fresh Water can run out, while the Tide is at this Height; but the Troughs being proportion'd properly, the Discharge during the Hours of low Water is sufficient. As the Doors of the Troughs keep out the Water there, the Banks keep it out from the Edge of the Field; and the whole is at once secur'd from Inundation.

This is an Undertaking in general the more profitable, in that the Lands thus recover'd, are  
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for the most Part of the best Kind we know for Pasturage. There is some Expence in the making of the Bank, but it is easily kept up, and the Troughs, if made of proper and firm Stuff, will last a great while without Repair.

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### CHAP. IX.

#### *Of the ordering of Salt Marshes.*

**T**IS a great Quantity of Land in this Kingdom that comes under the Denomination of Salt Marshes, and this is with Reason separated from all other Land, being in its Nature, Qualities, and Products different from all beside. The Sea Water is to be kept off from this, and that often at a considerable Expence; but this is not all that is required for the rendering it useful according to its intrinsic Worth. For this Reason it were idle in this Chapter to treat only of the Means of keeping it dry: the whole Method of managing or ordering it shall be laid down.

A great deal of the Salt Marsh Land in ENGLAND, is at present turn'd to a very good Account. But the greater Part even of that might be made to yield a much larger Profit, and some that is utterly neglected, because Improvements of it are supposed impracticable, might be render'd of great Value to the Owner. We shall therefore begin from the Source here. We shall enquire into the different Conditions of Sea Marsh Land, and lay down not only the common Methods which are every where practis'd with Advantage, but make publick such as are peculiar to certain Places, tho' they may be useful in all; and finally add, what Reason shews may be done farther with Profit.

In the first Place, what we understand by Salt Marsh Land, is a Land that lies low and flat, and is within the Reach of the Sea, or Salt Water, at the Mouth of great Rivers. Hence it is liable to be overflow'd by the Salt Water, and the Ditches are full of the same at all Seasons of the Year.

Now we may easily see, that though this Land be ever so good in itself, as the most part of it is very rich, yet from this Condition of being continually liable to Overflowings of Salt Water, it will be soaked too much: it will yield or keep no fresh Water for the Use of Cattle: no Trees or Shrubs will grow well upon it; so that there will want Shelter: and its Produce, whatsoever, will be liable to be cut off by the nipping Winds of the Spring, because it is expos'd to them, and to the Sea Breezes which are yet more destructive than they.

By this Account we see how many Disadvantages this Land lies under, besides those of that before mention'd: but still its natural Richness makes it worth taking Care of. The Work must be more, and the Expence greater than that which is needful on the other, but then it will answer very well by its Fertility.

The two great Inconveniences attending Salt Marsh Land, are these, the Overflowings of the Salt Water, and the Want of fresh. These may be provided against, and when this is done, if we

add Shelter for the Cattle that are to be fed there, as well as the Crop they are to be fed upon; we shall bring them to be equal or superior to any Pasture Lands whatsoever: and this is to be done with Certainty.

For the first Thing, let the Undertaker of these Lands, when he has consider'd the Source of their Misfortune, the Abundance of Salt Water thrown on them; examine their different Condition; in what Degree they are liable to it; what Quantity of building or banking will be needful to keep it out; and in what Respect they are as to Shelter and Trees.

When this has been thoroughly consider'd, let him set to work, remembering that he has three great Articles to accomplish, namely, the keeping off the Salt Water, the getting a Supply of fresh; and the giving that Shelter which Nature has denied.

The Sea or River Tides are to be kept out by Banks or Walls. When 'tis only the Water of a River to which they lie expos'd, banking will do, but then it must be at a very great Expence: where 'tis the main Sea that beats upon them, Walls are the best Security, and these must be made of a vast Thickness to resist the Force and Weight of the Water; and of a great Height to defend the Lands from the highest Tides.

When Banks are used, they are to be cautiously made in Form as well as Substance, and no Expence is to be spared in the giving them a due Body and Height; for if there be, all that is bestow'd is often thrown away. To come to Particulars: when the main Sea is to be fenced out from a good Compass of flat Salt Marsh Land, let the Undertaker lay the Foundation of his Bank fifty Foot broad, and carry it sloping and tapering all the Way to the Top. The Height must be ten or twelve Foot, and the Thickness at the Top about three Foot. It is to be raised of sound Earth well laid together; and the Slope is to be principally on the Face next the Sea. This Part must also be cover'd evenly with Turf, like a Bank in a Garden; that the Waves may roll easily against it; not bearing against a Perpendicular with all their Weight and Force, nor meeting with any Thing to stop, interrupt, or ruffle them in their Course.

Let any one observe the washing of the Sea Water upon such a Slope, and upon a common Shore, which is rough as Nature leaves it, and he will soon see the Reason of this Advice. The Waves have fifty Times the Force against the Ground where they are stop'd, and broken, that they have when they roll up evenly and smoothly.

While the Face of this Slope is entire, they always run up in that Manner, and the Bank is secure; but whenever there is the slightest Breach in the Turf, the Waves tear and enlarge it in a surprizing Manner. This may instruct the Owner to have the Bottom of the Banks carefully look'd to from time to time, that the Turf is kept sound. A small Expence will answer this, for 'tis only two or three Feet at the Bottom that is liable to Mischief, the Tides rising but so high against a ten Foot Bank.



Bank in their common Course; the rest of the Height being made for preserving against those extraordinary Tides, which happen once in a Year or two, or at greater Distances of Time.

Where Stone is to be had conveniently, Walls are an excellent Fence against these Seas. Their Proportion must be nearly the same with that of the Banks; and they answer to the additional Expence by being very durable.

The Name of a fifty Foot Bank may fright one who is not accusom'd to this Kind of Work, but it does not come to so much as might at first Sight be imagin'd. 'Tis of this Thickness only at the Foundation, and 'tis to be made, at the common Price of Labour, for an Expence that a few Years of the Profit by the Land repays.

'Tis here set at the highest: where the Sea has less Power, a smaller Expence will serve, but at the most that can be needful, 'tis perfectly worth the Charge.

When the Land is thus defended from the Overflowings of the Salt Water, it will be found in a Condition to bear excellent Pasturage; and the next Consideration is to find fresh Water. For this Purpose let the Undertaker look out for a convenient Part of the Land, and there sink a large Pond. Let this be well lin'd at the Bottom and Sides with a tough Clay, and left to receive the Rains. It will hold these, and supply a large Number of Cattle.

When the Recovery of this Salt Marsh Land is carried thus far, the next Deficiency is to be consider'd; that is, the Want of Fences: whether these are wanted in the common and literal Sense of the Term, of separating one Piece of Land from another, or not, they are sure to be needed doubly here, to what they are on any other Lands, in the farther Occasion of sheltering the Cattle, and defending the Grass from the Winds.

We have seen the Land from a Salt Water Marsh, reduced to be dry, and to bear good Pasturage, and we have supplied it with fresh Water: but we shall find the Cattle miserable for want of Shelter, and the Grass will often be seen cut off at the Tops in Spring by the Sea Breezes, as if it had been mow'd. To prevent this, the first Attempt is to be by Plantations of Trees and Hedges. Ditches alone will serve for Fences, and the Separation of Grounds in those Places, but these are wanted for the other Purposes.

If one Kind of Tree or Shrub will not thrive upon the Ground, let the Undertaker try another, and so on till he has gone the Round of all that can be useful. It must be confess'd, there are some Salt Marshes on which none of the common Trees will thrive; but even here there are uncommon ones to be called in. The late Lord PETRE, of THORNDON in Essex, gave Slips of a particular Shrub, called the Sallow Thorn, or Sea Buckthorn, to an Owner of some Marsh Land, whereon no other Hedge would grow, and it succeeds to this Day very well. This is not the Shrub one would chuse preferably to others for a Hedge; but where others will not thrive, 'tis valuable.

The Native Place of this Sea Buckthorn, as its Name expresses, is by the Sea, so that no Wonder it does in these Places. 'Tis raised for

its Beauty in most of the Nursery Gardens, and to be had cheap enough; so that a Fence is easily rais'd with it. When other Things have fail'd, Prudence recommends the Trial of this; and though not at this Time commonly known, he will be of real Service to his Country, who contributes to make it so; and to shew by Example, the Truth of what we have propos'd.

If this Shrub cannot be had; or if the Place be such that this will not grow, it will not be necessary altogether to give up the Trial. Shelter is as needful as even the keeping the Ground dry, and other Means must be attempted.

The Undertaker is by this Time acquainted with the Nature of banking. He has had it done in great Strength, and consequently at a large Expence on the Edges of his Land; let him order it to be repeated in a slighter Manner, and at a smaller Expence in the Middle.

A Bank will at any Time answer the Purpose of Shelter and Defence, both to the Crop and the Cattle, as well as a Hedge; though it does not answer all its other Purposes.

It will be convenient for this Use to raise a Couple of Banks in strait Lines along and across the Land, or in any other Direction where the Course of the Breezes renders such a Variation necessary. These may be six Foot high, and just of a Thickness to secure them from Accidents. They will break the Force of the hurtful Winds, themselves; but that is not all their Use, for they may be planted with Trees and Shrubs, which will grow upon them, though they would not upon the Flat; and thus all the necessary Uses of Defence and Shelter will be answer'd.

Proper Care must be taken, that the Trees and Shrubs set on them are such as will stand the Sea Breezes best; and thus there will be the Ground Work of a fine Plantation, useful and profitable for many Purposes, and on many Occasions; in the same Act that gives the Cattle and the Crop their first Shelter.

In this small Compass lies all that is needful to be done in the Ordering of Salt Marsh Land; and by these Means may all the Salt Marsh Land at this Time taken in thro' the Kingdom, be render'd of double Value to the Owner; and great Quantities that yet lie neglected, may on the same Principles be attempted with a Certainty of Success. This will be adding even to the Extent of our Island. No Lands are so perfectly added to it as those gain'd from the Sea; and there are in many Parts of the Kingdom great Tracts, which there requires only Spirit and Resolution to turn to a large Account, and make to serve as an everlasting Possession to their Families who recover them. This may be said with the greatest Truth, that upon a careful Examination of the several Lands of this Kind, that have been, and that might be added to our Island, a great deal is recover'd from the Sea, which lay much more desperate, than many Thousands of Acres that are at this Time utterly neglected.

Let him who has Spirit for such an Undertaking consider this. Let him observe the Situation of the recover'd Salt Marshes, and the waste overflowed Land of the same Kind, and he will see



fee beyond a Dispute or Doubt, that more Expence has been bestow'd upon the former, than is or can be needful on the latter. He will find that those Lands so recover'd at a greater Expence, have repaid it long since; and continue, and will continue for ever a very valuable Possession: what can therefore be so plain, as that these others must be worth the employing that lesser Price upon.

The Salt Marsh Land when thus recover'd and preserv'd in its useful State, exceeds all others whatsoever for Pasturage. It fattens Cattle sooner than any; and they are safe from the Rot, and many other destructive Disorders common in other Pastures, while they feed on it.

One Improvement there is of these Lands, which though practis'd in some Places, is far from being universal, though founded on the Principles of Reason and Knowledge. This is the letting in the Sea Water upon them at proper Times, and in due Quantity.

The Advantages of drowning Meadow Lands with fresh Water, are sufficiently known: this answers that Purpose, but not that only. We have seen already, that Salt is an excellent Manure in small Quantities, though it be destructive to all Vegetables of the Earth in too great Abundance. Why should we not therefore allow it in moderate Quantity to these Lands, when we have it so easily, and so happily in our Power, by the giving them a proper soaking of Sea Water.

We know they owe their particular Advantages over all other Pasture Grounds, to the Effects of the Salt Water, why then will we not give it them in a due Proportion, after we have banked it out in those over Quantities, in which it destroy'd the Land. 'Tis very certain, that in a due Proportion Sea Water will add to the Fertility of these Lands; and it is easy in the Ordering of their Banks and Fences, to provide for the letting it in at a proper Season, and in due Quantities. This I would have every one who is concern'd in Salt Marshes consider, and he needs not doubt but he will by a prudent and careful Observance of it, improve his Grounds above all those of his Neighbours.

'Tis upon the Sea Coast that the largest Advantages are to be made by taking in Land for these Purposes; and this is practicable with the greatest Certainty, and at the smallest Expence. Where the Owze is firm, and bears a tolerable Shew of Grass when the Tide is out, here the Expence is easier, and the Success more certain.

They have in many Places taken in the Owze where 'tis soft, and cover'd at low Water with Sea Weeds. This will come dearer, and be subject to more Disadvantages: it is therefore certain and plain, that the other may be done more to the Profit of the Undertaker, in Places where Nature favours the Attempt.

When any one shall determine upon this Work of recovering new Land from the Sea, he is to consider the Nature and Substance of the Owze, according to the Characters just given of Firmness, or Softness; and to conduct and carry on his Work accordingly: for in one Case the Bank may be made of the Owze itself, and in the o-

ther, the Matter of it is to be dug upon the Land beyond where the Bank is to be rais'd; and this makes a great Difference.

The firm Owze may be taken up, and rais'd directly into a Bank of due Height and Proportion, for it will dry and grow solid in the working. Whereas the wet, soft and muddy Owze, cannot be wrought into a Bank, or if it could, would not have Strength to stand against the Force of the Water.

There is also another great Reason why the Bank may be made of the hard Owze, and the Earth dug from under it, whereas it cannot, nor must, of the soft; and this is the different Effect the Sea will take upon a Hole being open'd in one and in the other Kind. When a Hole is made, though ever so large, in the hard Owze, the Sea can take no hold upon its Edges, so that it does not increase in Bigness; and as the Ground is firm underneath, it cannot burrow deeper. As this is the Case, the Hole is by Degrees filled up by the Sand and Refuse wash'd into it by the Water; and sometimes the Place is render'd level, as if there had never been any Thing done there.

On the contrary, when a Hole is thus dug in the soft and muddy Owze, it enlarges continually by the Action of the Water; and if it have been carry'd to any Depth, burrows underneath a great Way. Therefore if any ill-conceiving Undertaker should go to work upon a wet and muddy Owze, digging from before the Bank, what he employ'd in raising it, he would not only find it very difficult to get a Bank rais'd of so bad Materials, and would perceive it to be very bad when made, but the Sea continuing to burrow deeper and deeper in the Hole out of which that Matter was taken, would by Degrees undermine the Bank, and all the Labour would be lost, and the Expence that had been employ'd so unskilfully, thrown away.

This soft Owze may be taken in, and has been, very often to great Profit; the Earth of which the Bank is made being dug within: and if this be the Case, as is seen by Experience, to how much greater Advantage must the other always answer.

The Land thus recover'd where there is a firm Owze, is always better and richer than where it has been wet and muddy; and produces a better and more wholesome Pasturage: and in this Case it retains its former Level, either entirely or very nearly, shrinking if at all, very little; whereas the other will often sink two Foot or more in drying.

The soft or muddy Owze is found by Experience, to be a better and richer Manure for other Lands than the firm; but that is no Objection to what is just asserted, and what Experience confirms of the greater Fertility of the dry; for we have seen in the Consideration of Manures in its proper Place, that many Things serve excellently for the giving Richness to a Soil, which will not afford Nourishment to Plants themselves.



## C H A P. X.

*Of Hedges.*

**M**ANY Things have been already said, occasionally, of Hedges, respecting their several Advantages in Inclosure, and the Benefits which both the Herbage and the Cattle receive from them, in a secondary Way, by their Defence and Shelter: we now come to the more immediate and full Consideration of them.

No Article whatsoever, in the Husbandman's whole Concern, is of more Importance to him than that of Hedges: they are the first Object that naturally should strike his Imagination, as they are the Defence and Guard of all the rest. We have seen how much inclosed Land is preferable to such as lies open; and as this Advantage is originally owing to Hedges, it will be the greater or the less, as they are better or worse managed.

In all inclosed Lands the Farmer must keep up a good Fence, if he expect to reap the Fruit of his Labours. For it is by this that his Crops are secur'd from external Injuries. 'Tis evident therefore, that the better and the more perfectly the Fence is kept in Repair, the greater will be his Security of his Profits: and we may add, that the Consequences of one little Defect may do him more Injury, by letting in Cattle upon his Crop, than would have been the Cost of a most perfect and thorough Repair.

As Hedges are the general Fence, it becomes the practical Husbandman to bestow his greatest Care and Thought upon them; a great deal may be saved or lost by a proper or improper Management of them: and in order to make the greatest Advantage of them, he must do something more than follow the common Tract of others: for there is no Part of their Business in which the Farmers of ENGLAND are generally more deficient.

There are many Shrubs of which Hedges may be made, but there is one Kind almost universal, that is, the white Thorn. For one Hedge of any other Kind one sees a thousand of this. And there is Reason for the Preference; for none succeeds so well, or answers the Farmer's Purpose so perfectly, where the Soil will suit with it, which it does throughout most Parts of ENGLAND, without Exception.

In such Places as this generally us'd Shrub will not agree with, the Holly, black Thorn, Elder, Furze, and several others, to be mentioned hereafter, are to be called in; but the common Method is with this. When the Hedge is made with white Thorn, the careful Husbandman will not think it finished when he has set that alone; he will plant in it, at proper Distances, Timber, or Fruit Trees, and they will rise to a considerable Profit; but this, like all his other Advantages, will be proportioned to the Care he employs, and to his Attention to the Rules laid down for that Purpose.

As to Timber Trees, he is not to plant any at random, for one Kind suits one Soil, and another another: nor is there any one that may not

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be very valuable to him if it be rightly manag'd. In the first Book of this Work, where Soils are named, there are general Observations laid down of the Trees with which they severally agree best: but as the successful Growth of these depends upon the Depth, as well as the Nature of the Soil; and on many other Accidents, it will be proper for him who is about to plant an Hedge, to begin with observing what Trees flourish best in the Hedges of his Neighbours; for those it will be his best Practice to plant in his own.

The Ash about BRAMPTON in NORTHAMPTONSHIRE, not only thrives better than elsewhere; but it thrives better than any other Kind of Tree in that Place: and the Husbandman will have three Times the Profit from that he can expect from any other, when he falls upon a Soil that suits it in that Degree.

He is in the same Manner to study and observe the rest, taking for his Hedge such as he sees thrive most freely on the Soil: for there is more Profit in the meanest Tree, where it thrives, than in the best Kind, when it is starved.

In some Places it is a Custom to plant Fruit Trees in the Hedges, and they thrive as well as in Orchards: Elsewhere it may be proper to plant Crabs, and Pear-stocks, for the Use of the Orchard, in grafting Apples and Pears. Even the white Thorn itself, is not without its Use beside that in the Fence; for its Root, when of a certain Age, is knotted and veined in a most beautiful Manner, and serves the Cabinet-makers for many of their elegant Works. This is a Thing mentioned in all the old Books upon these Subjects, yet so little Advantage is made among us, of what has been written for that Purpose, that every body has wonder'd what the STILTON Cabinet-maker made his Tea Chests and other Works with, when his only Wood was the white Thorn Root. He had the Secret, as it was call'd, many Years to himself, but at this Time it is common in LONDON.

The Husbandman being thus far advis'd, as to the planting of useful Trees in his Hedges, we shall return to the Subject itself; and as the white Thorn Hedge is the most universal, it will be proper to begin with that, treating of the others afterwards.

## C H A P. XI.

*Of raising the Quicksets for a white Thorn Hedge.*

**A**S this is a very important Article to the Husbandman, we shall take it from the Beginning, setting out with his preparing his Sets before we advance to his planting them in his Hedge. In order therefore to accomplish the Task, we shall begin sometime before he intends making his Hedge; for by thus preparing, in Time, he will have all in perfect Readiness; and save the Expence of buying what he may raise for himself.

Now as he will want, in due Time, a good Quantity of white Thorn Plants, or Sets, let him prepare for them in this Manner. Let him make Choice of a square Piece of Ground, any waste

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Corner will do; and, to chuse, it should be upon a poor and dry Soil. This he is to use as his Nursery. It must be within a good Fence, that Cattle cannot get into it; but there requires no other Care, except that it stand defended from the North and West.

In NOVEMBER let this be plowed up, and prepared for the Seeds, and early in the succeeding Spring let them be sown; the Ground having been well weeded during the Winter. The Manner of sowing them is this.

Let Furrows of five Inches deep be made, at two Foot distance, and in these sow the Seeds of the common Haws, gather'd the Autumn before, and kept dry during the Winter. When the Seeds are evenly sprinkled in, cover them with a Rake; and then leave them to the Time of their shooting, which is not till the second Year.

As soon as they appear above the Ground, weed them carefully between the Rows, and immediately after give the Ground a good watering. And repeat this weeding and watering at Times, as shall be found necessary, till the young Plants are got up to a tolerable Height, and their Stems at the Bottom are about as thick as a Man's Thumb.

That is the Size at which they are fittest for Use. They are to be left standing in this Nursery till the Bank is prepared for their Reception, as shall be directed in the following Chapter; and they are then to be cut off, within five Inches of the Ground, and carefully drawn, that their Roots be not injur'd.

Instead of a Nursery some sow the Seeds of the Haws in their Coppices, the Year before they fell their Underwood; and the young Sets are thus got ready for Use without damaging the Wood, or taking up any particular Piece of Ground.

Some also prefer raising their Sets from Plants, the Seed being a tedious Method of obtaining them. But the Sets are always fairest and best from Seed.

Whichsoever of these Methods the Husbandman chuses, let him take Care to be provided with a sufficient Quantity of Sets, of a proper Size, against the Time when he shall want them; and then the Work is easy.

## CHAP. XII.

### *Of the making the Hedge.*

THE Husbandman having thus furnished himself with a sufficient Quantity of Sets ready for his Purpose, is to take a View of the Ground, and examine its Soil and Situation, that he may know in what Manner to set about his Work.

In some Places a Quickset Hedge alone is sufficient for the Purpose; in others a Ditch is necessary: this last is by much the most general Condition; we shall therefore enter at once upon the Consideration of this Kind; the Management of the other being, in a Manner, included within its Directions.

The first Thing to be done is to mark out the Course of the Ditch, and its Breadth. It is to

be three Foot wide at the Top, and its Depth is to be two Foot. Some dig the Sides perpendicular, but that is liable to many Inconveniences; for the Rains will wash in a great deal of Dirt from the Edges; a great deal more will be thrown in by the Cattles trampling about it; and they can walk and turn about conveniently in it; so that they will be continually in the Ditch, and cropping the young Shoots of the Quick.

To prevent this, the Custom of making the Sides sloping, and the Bottom narrow, was invented, and it is preferable to the other Method on all Accounts. It is best to allow but a Foot breadth at the Bottom of the Ditch, when it is a Yard wide at the Top. This will give such a Slant to each Side that the Edges will not so easily break in; and will cramp the Legs of the Cattle so, that as they can neither walk easily, nor turn about in the Ditch, they will not get that Habit of going into it.

The Breadth and Depth already-mentioned are, in general, sufficient for the Ditch in a common Inclosure; but where, from any particular Circumstances, it is judged convenient to make it larger, it must be carried on in the same Proportions.

When the Breadth of the Ditch is thus mark'd out, let the Labourer be set to dig; and that he may prepare the Bank properly for the Quick that is to be set on it, let him lay the Turf regularly, with the grassy Side downwards, upon that Side of the Ditch on which the Hedge is to be raised.

Upon this Turf, thus turn'd Bottom upwards, let him spread the best of the Mould; and having thus prepared a Bed for the Quick, let the first Row of it be brought in and laid.

Let the Sets be well chosen, let them be strait, smooth, even-growing Shoots, and well-rooted; and let them be brought fresh taken up. The Husbandman should have his Eye upon every Article of this Account, for his Success will depend upon his Regard to the smallest Particulars. The Beauty of his Fence will be altogether owing to the Choice of the Shoots, and their Growth will also, in a great Measure, depend on the planting.

The Bank being thus far prepared, and the Quick ready, let it be laid carefully in. The Sets must be laid on this Bed, at a Foot distance; and with the End inclining a little upwards. This is the Method of planting the Hawthorn, or Quicksets; but this is not all that is to be done: The Fruit, or Timber Trees, are to be planted at the same Time with the Quick, else it will make a Disturbance.

Let the Course of the Bank be measured, and at every thirty Foot make a Mark. At each of these Marks plant a thriving young Tree of Oak, Ash, Elm, or whatever Kind is found to succeed best in the neighbouring Soil; or of such Fruit Trees as will agree with it, taking Care to set it upright and steady.

One Row of Quicksets being thus laid, let them be cover'd well with some more of the best Mould; and upon this let there be laid a Covering of Turf, turn'd Bottom upwards, and laid even, and in a workman-like Manner.

Upon this Turf spread another Covering of the



the best of the Mould, to make a Bed for a second Row of Quick. This Bed is to be in the whole a Foot thick over the first Row; and when the Bank is well rais'd to this Height, another Parcel of Sets are to be brought fresh, strait, and well rooted as before directed. These are to be laid in the same Manner as the first, with the Ends inclining a little upwards, and placed at a Foot Distance one from the other; each being laid in the Middle of the Space that is between every two of the first Row.

When these are carefully laid, they must be cover'd with more good Mould, three or four Inches thick, and then the Soil that is dug out of the Bottom of the Ditch, is to be laid over this Earth, and the Bank finished with it.

The Ditch is now dug, and the Earth thrown up is all employ'd, the Quicksets and young Trees are planted, and the Bank is made. The Hedge and Ditch therefore are finish'd, and there requires nothing more to be done, but to secure them from Injuries.

The very Form of the Ditch has been so contriv'd, as to defend the young Quick from being eaten up while shooting, but there requires more than this to be done for its Preservation: it must be defended from the trampling of Cattle, and in some Degree shaded from the Sun. Though the Cattle would not come into the Ditch to eat it up, they would climb over such a Bank as this; and destroy all the Work; and the full scorching Sun upon the young Sets, would be too powerful without some Shade.

For the Defence and Shelter of these Sets, a dead Hedge is to be made at the Top of the Bank. This is a Hedge of dead Wood fasten'd by dead Stakes, which being well wrought together, will stand very securely, till the Quick is of such a Height and Strength, as to need no Defence upon its own Account; and to be a sufficient Inclosure to the Land.

For the dead Hedge a proper Quantity of Bush Wood is to be provided, and a proportionable Number of Stakes. These are the better the sounder Wood they are made of; and therefore none is better than Oak for the Purpose. If Oak cannot conveniently be had, Sallow will answer the Purpose very well; for this, though a light Wood, is firm and durable; and is found by Experience, which is the only Thing to be rely'd upon on these Occasions, to exceed all other Wood, the Oak alone excepted.

The Materials being thus prepared, the Stakes are to be first driven into the Ground: they are to be of such a Length, that they may be thrust quite through the Bank into the firm Earth below, and enough remain above for the Service of the Hedger; if they do not penetrate four or five Inches into the Soil under the Bottom of the Bank, the whole Hedge will stand but an ill Chance.

These Stakes must be driven in at two Foot and a half Distance, and the Workman ought to see that each stands firm and fast. Then let him begin the Hedge. He must lay the small Bushes at the Bottom in such a Manner, that they may cover the Quick when it first shoots, and be a Defence to it against the Bitings of Cattle, that may chance to get down into the Ditch.

This is the first Care: after this the long Bushes are to be laid in, and the longest of all at Top twisting them in between the Stakes.

When the Hedge is thus carry'd to its due Height, let a Parcel of long and slender Poles be provided, and the Tops of the Stakes bound in with them on each Side; this is what is called in the Country Phrase, eddering a Hedge: and this finishes the Work.

But in order for more full Security, as the Stakes may have been moved in the making up of the Hedge, the prudent Husbandman will see them all well driven again. A few Inches more in Depth gives them now a great Strength, and the Hedge is thus secur'd against all Accidents, and will stand with Ease the full Time it is wanted.

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### C H A P. XIII.

*Of the Seasons for planting Quicksets, and the Choice of the Kinds.*

THE Husbandman has seen in the preceding Chapter, the compleat and exact Method of making a Quickset Hedge: we shall now lay before him several Particulars relating to the Time for his making, and repairing his Work; the Choice of his Seeds; and other such Particulars; which, although some of them may appear less important, are all worth his serious Consideration.

There are two Seasons in the Year for planting a Quickset Hedge, and only two, for it will not succeed in any others. These are early in Spring or late in the Autumn.

For the Spring planting, the last Week in FEBRUARY, and the first in MARCH are the best; for the Autumn, the whole Month of OCTOBER, and the first and second Week in NOVEMBER: a Quickset planted at either of these Seasons will grow, but by what I have seen from frequent Experience, I prefer the Spring Plantation. I have always made my own Banks for Quick in the first or second Week in MARCH, and advis'd the same to my Friends; and I may boast, that no Person whatsoever has planted Quick with more Success.

Two or three Times in my Life, I have try'd the Practice so strongly recommended by some, of laying in three Rows of Quick into the Bank instead of two, but I have never found it succeed so well. They require that the Bank should be of an unseemly Height, to keep them at a due Distance: and if this be not done, they starve one another.

The Roots of white Thorn spread a great Way, as I have seen by repeated Experiments; but a great deal of the Nourishment is for the first three or four Years taken up near the Stem, and in this Case the three Rows blend their Roots together, and destroy the Growth of each other. Of this I am certain, more Wood will be produced in the six first Years from two Rows, than from three.

In Places where the young Quick will be too much exposed to Cattle, there must be a dead Hedge on the Edge of the Ditch, as well as on the

the



the Top of the Bank. This is an additional Expence, but it keeps the Work secure, and gives the Quick Leave to spring without Molestation; and the Success is always speedier, as well as greater.

When the Quickset Hedge is to be made without a Ditch or Bank, the Plants are to be disposed in a different Manner from that used in the common Way of working. They are to be set nearly upright in two strait Rows by Line, and about a Foot Distance one from another. They will thrive this Way very well; but should be fenced with a high dead Hedge on both Sides, for they are more exposed to Mischief of every Kind, than the others.

Most Soils and Situations will bear the Hawthorn, and whenever it will thrive tolerably, it is preferable to any other Shrub by way of Fence. Where there is too much wet, or where the Soil is perfect Sand, it does not succeed; but for these Places other Shrubs will be proposed in the succeeding Chapters.

If the careful Husbandman will look into the Hedges, he will see there is a manifest Difference among the Hawthorn Shrubs; some having more some fewer Branches; and some much larger Leaves than others. As I have advised him to have a little Nursery for the raising his Sets, I shall here add a very material Piece of Advice, though little regarded in general; that is, that he gather the Haws for Seed himself, and that he take a particular Notice from what Shrub he gathers them.

He will find that the Hawthorns with smallest Leaves have the most Branches, and the greatest Number of Thorns. These therefore will be sure to make the best Fence: and I have observ'd, that they are the sturdiest, and least liable to Accidents while young.

Let him gather his Haws when they are well ripen'd, from one of these small leaved bushy Shrubs, the smaller leav'd and more bushy, the better; for the Sets will follow the Nature of the Parent Tree, or improve upon it; especially as I have directed the Nursery for the raising them to be upon a poor Piece of Ground: for Richness in the Soil tends to throw the Nourishment in all Shrubs into the Leaves, and not into the woody Part.

One Reason therefore of having the Nursery upon a bad Piece of Ground is, that from the Seeds of a bushy small leav'd Hawthorn, the Sets may continue of that Kind; but there is another much more material, which is, that on this Circumstance depends in a great Measure their thriving in the Hedge. For this is a certain Rule, that young Trees when they are taken out of a rich Soil, and planted in one that is poor, never thrive well: and on the contrary, such as are transplanted out of a poorer Soil into a richer, grow surprizingly. Now the Banks on which Quicksets are planted for Hedges, rarely are of an over-rich Soil; so that the Way to have the Sets thrive, is to raise them in one that is yet poorer.

The Poorness of the Soil is also the more needful, in order to raise the bushy Hawthorn from its Seed without Failure, because this is not a distinct Kind of Hawthorn, but only what

the Curious call a Variety; so that if the Seeds of this be sown in a mellow rich Land, they will produce a stragling, loose, and large leav'd Shrub, as I have seen by Experience.



#### C H A P. XIV.

##### *Of keeping the Hedge in order.*

THE Method has been now laid down, not only of making a Hedge; but of doing it in the most profitable Manner, in respect of every Article in that Concern. We will suppose it now made; and proceed to the necessary Care of it under its natural and accidental Damages.

The next Spring after the laying of the Quick, let the Farmer go over the whole Bank with a careful Eye. First examining the dry Hedge at Top, whether it be firm in every Part. If he find it loose any where, let this be remedied by driving a new Stake, or fastening the old ones: and if any other Deficiency appear, let him see it repair'd in the same Manner. A very small Expence will do this the first Year, whereas it might be ten-fold the next: and the going over it at the End of one Year in this careful Manner, will often secure it for its Time.

When he has rectified what was amiss in this, let him view deliberately and separately, the Quicksets. Some of these, in Spite of all his possible Care, will fail; so that he will on this Examination find some dead, and others in a declining Way. He must now see fresh Sets put in the Place of the dead ones; and trim up the others with due Care.

Some advise the Planting the Fruit or Timber Trees in the Hedge at this Time; and others recommend the doing that, when it is at two, three, or four Years Growth: but from what I have seen in Practice, I greatly prefer the planting them at the making of the Bank, at the same Time with the Quick: for thus they take their Growth together; and there is no Disturbance of the Fence, as there must be in planting them when all is settled.

Before the Farmer takes a View of his young Quickset, let him order it to be weeded. This must be done carefully and thoroughly: and it must be repeated at Times, for the Quick, while it is young, should have all the Nourishment the Ground can yield, and not be starved by the Weeds. This clearing will give the Owner a distinct View of the Condition of the Sets, that he may know what to supply.

At this Time while the Shoots are young, too much Care cannot be taken to guard them from Sheep: for they are very fond of the tender Buds: and their cropping them at this Period of their Growth, is particularly destructive.

If by any Accident Sheep have got at it, or other Cattle, it will be discover'd by the Tops being eaten off, and crop'd irregularly, and mangled at the Ends. In this Case there is but one Method to restore any Hope of a good Hedge: the whole Growth must be evenly cut off, within an Inch and half of the Ground; and there will then be a new and fresh Set of Shoots,



Shoots that spring, which would not have happen'd from the gnaw'd Ends, at least not with any Degree of Regularity or Beauty.

If the Weather have been unfavourable, or the Soil too poor; or if from any other Accident the Shoots are perceived to be weak and bad: the same Practice is to be observ'd as in the other Case: they are to be cut off within an Inch and half of the Ground. This will give the Roots new Strength; and the second Shoot which follows this, will not be so faint. I have seen a very languishing Quick perfectly restored by this Method.

From this Time very little Care is required till the Hedge is of a Growth for plashing; this is not till eight or ten Years after the Planting, and is an Operation that shall be treated of separately in another Chapter. But though little Care be required during the first Year's Growth of a Quickset, less than that little usually is taken, for many give themselves no Trouble about it at all.

Let the industrious Husbandman do otherwise. Let him from Time to Time look to it; and remove its Redundances, and supply the Defects. Let him with his Knife take off ill-shap'd and stragling Branches. Let him see that no unnecessary dead Wood be left at the Bottom, for that will choak the Quick. And let him carefully root up all those tangling Weeds, which are so common in Hedges, and at once spoil their Beauty, and injure their Growth.

The principal of those Weeds which are destructive to Hedges, are four. White Bryony, Black Bryony, Travellers Joy, and Bind Weed: these all cover the Hedges to a great Extent.

White Bryony has Leaves like a Vine, and red Berries. The Root is as big as a Man's Leg, and whitish; it must be dug out deep, for it runs a great Way into the Ground; and if any Piece be left, will shoot from it. Black Bryony will grow thirty Foot long, and entangle and choak the Quick all the Way. It has Leaves like a Heart, and the Root is thick, black on the outside, and white within. It must be dug up like the former.

Travellers Joy has woody Stalks, and spreads a great Way. The Leaves are small, and of a pale Colour; and it bears white thready Tufts in Autumn. It is more destructive of the Quick than any of the others; over shadowing it in the Manner of an Arbour. The Root of this is not large, nor lies deep like the others; but the Farmer must take Care he gets it up entire, for the least Piece of it will shoot again; and the Bush is of quick Growth.

Bind Weed is the smallest of these Weeds, but it will crawl among the Branches to fifteen Foot length; it has Leaves shaped like the Head of an Arrow, and bears in JULY large white Flowers like Bells. The Root of this Weed is slender and white. It does not go deep, but runs a great Way under the Surface of the Ground; and should be got out entire, for the least Piece of it will grow, and send up new Stalks.

All these Weeds should be watch'd in their young State, and tore up before they come to flower or Seed; for after that there will be an

eternal Brood of them: but if they be thus destroy'd, all the Farmer will have to do is, to watch the Rise of such as come from chance Seeds, and they are but few.

By these Directions; but chiefly by keeping a watchful Eye from Time to Time upon the Growth itself, the Farmer will raise his Quickset Hedge in Strength and Vigour: and by as much as it is handsomer to the Look than those of his Neighbours, so much it will be better, and more healthful. We shall now leave it to grow to the eighth Year, or thereabouts, and then proceed to the Plashing of it.



## C H A P. XV.

### *Of Plashing a Hedge.*

**T**HOUGH the Plashing of a Hedge is to be first perform'd at about eight Years Growth, this is not the only Time. It is to be repeated afterwards at different Periods; and as there is more Art requir'd in this when an older Hedge is be plash'd, than when it is a young one, we shall best instruct the Husbandman in doing this to the greatest Advantage, by describing the Method to be observ'd when it is old. What is to be done in plashing of a Hedge of twenty, or five and twenty Years old, includes all that can be needful to know for doing it on one that is younger; but on the contrary, more is required for the old than need be done to the young.

We will suppose the Hedge planted and dressed, as already describ'd, to be grown to five and twenty Years standing. It will by this Time be loose and irregular in its Growth, there will be Vacancies at the Bottom, and Gaps in many Places, and it will be full of thick and old Stumps, and Stubbs, as well as of young Shoots. These latter only are for Use: the others are to be cut up, for they encumber the Hedge, and prevent the Growth of better Wood.

Upon a View of the Condition of the Hedge, the Husbandman is to consider in what Manner he is to go to work. The Stubbs are declared useless already; but among the rest he must consider, that he is to reserve some Shoots for laying down, and others to serve by way of Stakes. For the first Purpose he is to select those which are longest, and freshest; and such as are of a middle Growth: for the Stakes, he is to leave such as are somewhat larger, and stand properly, and grow tolerably strait for the first five or six Foot: it matters not for the rest, because they are to be cut off at that Height: their Use requiring no more.

When the Husbandman has thus consider'd, let him go to work. He is to cut away all the old Stubbs within two Inches of the Ground, striking them off sloping. After this let him go on thinning his Hedge, by cutting away all but the proper Shoots for Stakes, which he is to strike off at the Height he designs his Hedge, and the long Shoots for laying, which he is to leave entire.

As there will not be enough of these Shoots  
H h for



for Stakes, growing as they should do; he must make some others to drive into the Ground, where there is a Deficiency.

When the uselefs Stuff is thus cut away, a Spade may be got between the Shoots; and the Labourer is to be employed to clean away and new make the Ditch. Let him dig this just as it was at first; making the Top wide, the Bottom narrow, and the Sides sloping.

As he is at work upon this, let him clean away all Filth from about the Roots of the Quick; and where the Earth has moulder'd away from them, add some of the best that comes out in digging the Ditch, pressing it well into the Hollows. It is impossible to conceive, but from one's own Sight, what a Refreshment this cleaning and digging of the Ditch, gives to the Roots of the Shrubs. A vast many small Roots are cut off, and they might be supposed hurt, but they soon send out many more. The stirring of the Earth about them is of vast Service; and thus the Roots having a greater than ordinary Supply of Nourishment, and having a smaller Quantity of Wood to feed, that which is left flourishes surprizingly.

A great deal of the better Mould from the Ditch, will be thus us'd in filling up Holes, and facing of the Bank, the rest is be laid at the Top: for if the Sides be loaded they will break with the Rains, and what falls off will choak up the Ditch. And as it would be only hurtful thus laid on the Sides: it is of great Service when laid on the Top, heightening the Bank, and greatly improving the Fence. The Labourers don't like to hear of this, because it gives them more Trouble, but it is the Master's Business to see it done. He who pays them is not to suffer by their Idleness.

We have directed, in the making of the Hedge, that either Fruit or Timber Trees should be planted at proper Distances. These the Husbandman is to leave standing among his Shoots. They have nothing to do with the Hedge, though they grow among it; and they are to be lop'd in the usual Manner, if Timber Trees: and if Fruit Trees, to be prun'd up above the Reach of the Cattle: and all that is to be done to them at these Repairings of the Fence is, that partly by this pruning, and partly by staking, if necessary, they are to be brought to spread and lean over the proper Ground, where both Sides of the Hedge are not the Owners.

The Ditch is now clean'd, the Bank repair'd, and the Stakes ready. Let the new ones be well and firmly driven, where there are not a sufficient Number of the upright Shoots left for that Purpose: and these being disposed, the Work is ready for the Plasher.

He is to take each of the long Shoots which be left standing severally, and bending it gradually he is to give it a sloping Cut with his Bill half through; it will then fall easily, and he is to weave it in between Stake and Stake carefully.

When he has thus work'd in all the Shoots left for that Purpose, he is to go over his Work, and trim off the straggling Sprigs, to render it uniform and even.

A great deal of the Success of this Work depends upon the Method of laying these Boughs,

when they are cut through so far as to obey the Hand of the Workman. If they be laid too low and too thick; as many do, thro' an Opinion of its strengthening the Hedge, the Sap is all sent into the Shoots; and the Plashes starve and will decay. On the other hand, if they be laid too high, then they draw in all the Nourishment; and the Shoots are starv'd. Both these Accidents are to be avoided by a middle Course. It is not the Farmer's Interest to starve the Shoots to feed the Plashes, nor to ruin the Plashes for the Shoots: he is to derive a proper Quantity of Nourishment into both; and this will be done by laying them in a middling Way. Beside this has another Advantage; that if the Plashes are not too deep cut, and are laid thus evenly, or nearly upon a Level, the Sap is not all directed to their Ends, but sends up Shoots from every Part.

This Abundance of young Shoots will also be promoted by the proper cutting of the Branches of the plash'd Boughs. They are to be cut off short, at five or six Inches length on each Side of the Hedge; and this will make them send out Side Shoots of their own, as well as promote the Growth of the others, to the great Beauty and Strength of the Hedge.

Many have a Custom of making their Hedges too high: but this is wrong for several Reasons. Let the Bank be rais'd carefully and firmly; and let the Hedge be made just high enough to serve as a Fence, and no more; for it will quickly raise itself higher: and always in those Hedges which are too high, the Quick is straggling at the Bottom. The lower the Hedge the more free the Shoots always grow, and the thicker and closer the Fence is at the Bottom.

A Hedge must be of a considerable Growth to require this full Care and Nicety in the plashing: when it is younger the Business is done with more Ease and less Ceremony: but on the other hand, the Husbandman has sometimes to do with an Hedge that is too old to be repaired by plashing, with all the Care he can take; or by the nicest Observations of these Directions.

In this Case there is but one Thing to be done. Let him cut up all the Stubs, and make a good dead Hedge on each Side, to secure the young Shoots that will rise, till they are of a proper Height to plash. As there will be Vacancies between some of the Stubs, these are to be supplied by fresh Sets, which will grow up with the Shoots from the Stumps, and the dead Hedges are to be kept in Repair till these are of an Height to be useful.

When an Hedge is new plash'd it shoots out very vigorously, and these fresh Branches tempt the Cattle. It is therefore always best, if the Field can be kept from seeding the first Year at least. If it can be kept for mowing, this answers some Purpose, but if plowed, it is of twenty Times the Service; because that stirring and turning up of the Ground gives Vigour to the Roots of the Quick; and forwards the Shoots prodigiously.

This may instruct the Farmer to suit his several Businesses to one another. He is never ty'd down to a particular Year for the plashing of an Hedge: let him therefore take the Opportunity of doing this when the Ground is to be plowed,



plowed, at least when it is to stand for Hay.

If he cannot do this; for Things will sometimes fall out crossly, let him remember what Cattle are most and what least mischievous, that if he must feed the Ground it may be to the least Disadvantage that may be. Horses, of all other Animals, are least apt to crop the Quick. Cows and Oxen are too fond of it: but Sheep most of all. They are therefore to be kept out of the Ground, for the first Year at least if possible, with any Degree of Conveniency.

As to the Seasons of plashing of Hedges, there is but one proper. Some do it in OCTOBER, and pretend particular Advantages from that Time: but let the Husbandman trust to Experience, and assure himself that the only right Season is the Month of FEBRUARY.

While the Hedge is growing up from the plashing, it will be proper to have the same Eye upon it as at first; taking Care, in Spring and Fall, to cut away the straggling Branches, and to root out Weeds: thus the Fence will grow regular, thick and clean; and from this renewing, in the same Manner as from its first Rise, will exceed, in every Respect, those of the Neighbourhood, which are not looked after with the same Degree of Care.

We shall add only two or three slighter Admonitions here, and then conclude this Chapter. When the Hedge is plash'd, the Shoots laid down, and wove in, and the straggling Branches of them are going to be cut away, let there be a Reserve made of the finest, toughest, slenderest, and longest of them. Instead of cutting these away let the Workman bend them to his Purpose, and to that End give them a Nick at the Bottom, if necessary, and then bind in the rest with them. This finishes the Hedge beautifully and durably. After this the whole Work may be, at Times, over-looked, the dead Stakes driven a little down, and the plash'd Boughs press'd also gently lower: all which will make the Hedge more firm and durable: and where from Necessity, or Accident, there is no keeping Cattle away, it is a good Practice to scatter some dead Thorns over the Top of the Hedge, and about its Bottom, by way of Defence, till the young Shoots have some Strength.

When in a very old Hedge the Stubs are so large that they break in upon the Uniformity of the whole, and are liable to make Gaps by the Cattle getting by, at one Side or other of them, the Method is to cut them so nearly through by the Ground, that they may be bent down; they are then to be sway'd till they can be laid slanting, the Head of one upon the Stump of another; and the natural Vacancy in the Slant is to be fill'd up with the Side Shoots. By this Method, and by keeping the Bank high, and in good Repair, a Fence may be made out of very unpromising Materials; but in general it is better in these Cases either to cut down the Stubs, as before-directed, making a dead Fence on each Side, waiting for a fresh Shoot from the Roots; or else when the Case is most desperate of all, as when the Roots are extremely old, and stand very straggling, to stub the whole up entirely, and begin from the Foundation, making a new Quickset as first directed.

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## CH A P. XVI.

### *Of the Profits that may be made by Hedges.*

SO familiar and so easy is the making and preserving a Quickset Hedge, according to the known Methods, when the Husbandman will be careful to enquire by reading, and by questioning his Neighbours, what all those Methods are; and will be industrious enough to see them all put, in a proper Manner, in Execution, under his own Eye. He is not to content himself according to the common Custom, with giving his Orders, and leaving all to the Care of idle Labourers, and negligent Servants. They are not to reap the Advantages, and they cannot be expected to take the Care. But he is inexcusable who is to have all the Profit; and who will not overlook the Work, and see if it be done in the most beneficial Manner.

From the little Care that is taken about the hedging Work, it appears to me very plainly, that the Profits which may arise from it are not known: I shall therefore speak what my own Experience has shewn me on that Head, in order to stir up the Husbandman's Spirit.

This is certain, that it is the Landlord's Interest to plant or to promote the planting of Fences in this Kind, because, as observed before, the Rents of his Estate are sure to be encreased by it: and I shall shew that it is not less the Tenant's Interest than his. I know several who will grudge to serve their Landlord when it turns to no Account for themselves, may be brought into it when they find it will answer their own Purposes also. And upon this Plan there will be no Oppression in a Landlord's insisting upon a Covenant of Fencing, in the Lease, when the Tenant will himself reap the Advantage for his Time; as the Owner does in all these Cases for ever.

If Hedges were of no other Use except as Fences, it would be the Farmer's Interest to keep them up carefully: for the better the Fence is, the greater is his Security of his Cattle and Crop. But in many Counties of ENGLAND the Hedge yields a valuable Store of Fruit; and it might do so in all; for this being partial is owing to Custom only, the same Advantage is allowed to all by Nature.

The Shelter also of his Hedges, which we have shewn to be so useful both to the Crop and Cattle, is surely the Tenant's Benefit: but the greatest Inducement is behind, that is, the absolute Profit; which, for want of Industry and Application, few know. In reality they rob themselves of a great deal of Money, by their Carelessness in this, as well as other Articles; for it is as much their Interest, in this View alone of the Wood they will yield, to raise, cure, and dress their Hedges, as to tend and to take Care of any other Part of their Stock.

Mr. ELLIS, who is a Person of Veracity, assures from his own Knowledge, that a Farmer in HERTFORDSHIRE, who occupied only sixty Acres of Land in inclosed Fields, made in one Season a thousand Faggots from his Hedge-wood only, which



which he sold for about twenty Shillings a Hundred. This I have great Reason to believe, for I have seen nearly as much Profit in other Places, where the Quick does not grow so freely, nor is so well understood in hedging as in HERTFORDSHIRE, which is, in that Respect, the Garden of ENGLAND.



#### C H A P. XVII.

##### *Of the Sloe, or black Thorn Hedge.*

**I**T has been said already, that although the Haw, or white Thorn, is the most general Shrub us'd in hedging, and the best for that Purpose in most Places, yet it is not universal, nor absolutely suited to all. There are Soils in which it will not thrive; and beside this, there are Circumstances which may render some other Kind preferable, even in Places where that would grow ever so well. This is the Source of those other Fences to be described in the present and succeeding Chapters.

The black Thorn is the next in Value to the white, in a Quick Hedge. And it is preferable to that and to all other Shrubs, for a dead Hedge, because it is, of all Shrubs we have, the most thorny, durable, and naturally bushy.

The Ground can never give a Reason for planting black Thorn, and not white, for they will both grow and thrive in the same Soils; and if any thing the black Thorn requires a better: but notwithstanding this, we have already mentioned a very substantial Reason why the good Farmer should plant it.

He will always succeed better in proportion as he considers every Circumstance, and every possible Advantage. We have observed, that no dead Fence is so good as that made of black Thorn: for this Reason the Person who sees that he shall have Occasion for a good deal of dead Hedge, at any particular Time, or upon any particular Occasion, will do well to plant at least some Quicksets of black Thorn, if not all; and this, that the Cuttings, and superfluous Stuff rising from them may afford him a sufficient Supply of that excellent Bush, for the Purposes that have been already mentioned.

When the Farmer has this Reason for planting a Quickset of black Thorn, let him consider his Soil before he sets about it. More is required than his having Occasion for the Bushes, he must know that the Ground will bear them.

In the first Place he is to be inform'd, that a very poor Soil will not do for this Shrub, and that in a very rich one it is apt to shoot too deep, and spread too far into the Ground, to the Hurt of other Things. I have seen more Hedges of live black Thorn miss, than of any other Shrub whatsoever: this has been sometimes owing to the Badness of the Ground, but oftener to the Unskilfulness or Negligence of the Person employ'd to plant it: and I have, in other Places, where such an Hedge has thrived very well, seen all the other Growths starved within a great Way of it, merely by the Quantity of Nourishment it exhausted.

When the Husbandman sets out with this

Foundation of Knowledge, concerning the Nature of the Shrub, he will be able to work on it to his Advantage. Therefore, when such an Hedge is to be rais'd, let him chuse a Part of his Land where the Soil is rich, but not deep. A two Foot Coat of Hazel Mould upon a Bed of Stone, or a Layer of Clay is best; if any such offer upon the Land, the Farmer will be sure to raise an excellent Fence, and to do himself no Harm in his other Products.

Let him, in this Case, prepare for planting his Hedge exactly as has been directed for the white Thorn; only let him dig the Ditch half a Foot deeper, that it may go a Foot and a half, or more, into the under Layer, to stop the direct Progress of the Roots into the Land. It is true, they will, on these Occasions, sink down below the Bottom of the Ditch, and rise up again on the other Side, but not in such Quantity.

I would advise the Husbandman to prepare for his black Thorn Hedge exactly in the same Manner as for the other. First of all, let him, some Years before hand, turn up a little Piece of Ground in some waste Corner, sow it with the Stones of Sloes, and fence it well in, weeding the Plants now and then, after they are come up, which will not be till the second Year after sowing; and letting them stand till they are of a Size for Sets.

When they are thus ready, the whole Practice is to be exactly the same as for the white Thorn Hedge. And there is this Advantage when they are carefully set, and the Defects supplied after the first Examination, that they grow much quicker than the white Thorn to a certain Standard; and being more prickly, and not so well tasted, they are not so liable to be crop'd by the Cattle as the white.

There is a considerable Advantage in raising the Sets in a little Nursery of this Kind, they grow straiter and better; and when they are removed to a richer Soil, which should always be the Case, their first Shoots are much more vigorous. The Farmer will do well when he takes up the Sets for his Hedge, to leave several standing at proper Distances in the Nursery, because, by this Means, he will have a Supply of the Bushes for stopping up of Gaps, and other such Uses, for which they serve better than any other Kinds, before his Hedge affords them from the Cuttings.



#### C H A P. XVIII.

##### *Of the Furze Hedge.*

**W**E have mentioned, in the Sloe, a Kind of Hedge which will very well answer all the Purposes of a Fence, and which there may be particular Reasons for planting, even in Places where the Husbandman might, if he pleased, raise the common white or Hawthorn: we come here to speak of a Shrub which is also very excellent for making a safe and durable Fence, which, at certain Seasons of the Year, is also very beautiful; which always makes a pleasing Variety among other Inclosures; and which has this greater Advantage, that it may be rais'd in Soils and



and Situations where neither the white nor black Thorn will grow.

So much may be conjectur'd from what is seen in Nature. For we constantly in many Parts of ENGLAND, see the Furze Bush growing wild in vast Abundance, upon sandy, heathy, and barren Commons; where only here and there a black or white Thorn Shrub pops up its Head, and those half starv'd.

It has been observ'd already, that there are two Soils in which the white Thorn Hedge is not to be planted; these are very wet, or very dry and sandy. What the Farmer is to substitute for it in the wet Places, will be named hereafter; the Furze is the proper Shrub for the dry and barren; for there is no Piece of Ground so barren on which Furze will not stand.

Where there is therefore a Piece of Land to be enclos'd, from some exceedingly barren Heath; or where the Place for a Fence is some old dry and mouldering Bank of almost entire Sand; or where the Ground is so entire a Gravel, that it scarce deserves the Name of a Soil, there this Shrub is the Choice, and will succeed perfectly well. The worst Objection to it is, that it does not last a great while: but then it is easy to be renewed, and it makes an excellent Fuel. Perhaps if we would copy the FRENCH, whom we are apt enough to imitate in Trifles, in their Management of Furze, planting of Hedges of it of thirty or forty Foot thick, in Places where the Ground is really not worth Culture, as in absolute Sands, and entire Gravels, we should reap an Advantage little imagin'd. To our good Fortune we have not so much Ground of this Sort as they; but where there is such, it might better be used to this Purpose than to none; planting the FRENCH Furze, which grows five or six Yards high, and does not require any Care after the first Year or two.

They find these thick Hedges a prodigious and favourable Shelter for their Game; which is there the Property of the Farmer, as much as his Poultry; and they cut it up in the End for Fuel.

A dry barren Soil, and an expos'd Situation, is the Place for a Hedge of Furze. Where the Farmer has such an Occasion, let him not pretend to plant any other Shrub for that Purpose: nor in this is he to proceed in the same Manner as with the others.

Here is to be no Nursery for raising the Sets, for there need be no transplanting. The Shrubs must be rais'd from Seed in the Places where they are to remain; and the Method is this.

In the Place where the Hedge is to stand, let the Ground be plow'd up deep in Winter, and let it lie in that Condition till the End of MARCH. At that Time let it be once again plow'd, and then harrow'd, to make it as even and fine as may be. When this is done, that is, in the very Beginning of APRIL, go carefully over the prepared Ground, sowing it with well chosen and fine Seed, of that Kind called FRENCH Furze Seed.

When the Seed is in the Ground, let a dead Hedge be planted on each Side. It need not be a very strong one, for it will be necessary only

Numb. XI.

three, or at the utmost four Years. The Seeds will soon shoot, and the Plants when risen to some little Height, are to be thin'd and weeded. They are to be kept weeded from this Time till they are become tolerably sturdy, for then they will not suffer Weeds about them; and in three or four Years there will be a very strong and beautiful Fence without any farther Trouble.

As the Furze Hedges require less cutting than the other Kinds, so they will very little bear it. It is seldom needful to cut such a Hedge in Fields at all; and those over-nice People who will do it, often destroy the Plantation. If the FRENCH Furze Seed be sown, it rarely grows out much beyond the Bounds that were intended; for this Kind does not spread and run like the others: but if it happen under any particular Situation that it should do so, the best Way is to cut it up close to the Ground, and leave it to shoot again from the Roots.

In this Case it must be defended as at first, and it will soon spring up in greater Regularity. If the Circumstances will not admit of thus cutting it up; and it be needful to reduce it to Bounds; this must be done by cutting: but as that is in itself so hazardous, great Care must be taken in the Manner of doing it. The principal Cautions are these.

If Furze be cut too close into the old Wood, it will never shoot out again, so that when altogether needful to cut it, that must be done lightly. The Season must be greatly regarded also, for nothing is so liable to Accidents from the Weather as fresh cut Furze. If cold follows, it certainly kills the Branch that has been wounded, and often the whole Shrub: therefore it must not be cut either too late in Autumn, or too early in Spring, for the Frosts may be destructive.

On the other hand, if the Furze be cut in extremely dry Weather, the same Accidents follow as from Frosts, the dry Winds attacking the fresh Cut, part and destroy the whole.

For these Reasons 'tis much best, as before observ'd, never to cut one of these Hedges at all; but if it must be done, the only Season is the middle of APRIL, and then in perfectly moderate Weather.

Whether a Furze Hedge be new rais'd from Seed, or whether from the old Roots after cutting down, no Fence whatsoever requires so much Care in the guarding of it from Sheep, while it is first shooting. When young, they are extremely fond of it, for the Buds are soft and juicy, but when it has got a little Strength and Firmness, its own innumerable Prickles are a full Defence.

One farther Advantage of a Fence of this Shrub, is not to be omitted; that is, it will grow not only on barren dry Sand, but on the barren and naked Sea Sand, as well as the Native Sea Plants. This points out a very great Use for it, which is in the making of Fences, where every Thing else refuses to grow: these Places being generally supposed not capable of fencing by Hedges.

Scarce any Cattle will attempt to crop a Furze Hedge of some Growth, which has occasion'd some to imagine, that it is unwholesome, most Creatures having a natural Direction to avoid



avoid all such Herbs as are hurtful; but this is a common Error. There is nothing to cause this Shyness of Cattle to it, but the Prickliness of its Branches, for no Plant is more wholesome. They sow the FRENCH Furze in some of our Western Counties, on Land that will bear nothing else; and among other Uses, the green Tops are chop'd small, and given to their Horses. This chopping destroys the Prickliness, and the Creatures are then very fond of them, and very well nourish'd by them.



#### C H A P. XIX.

##### *Of the Holly Hedge.*

**H**OLLY is another of those Shrubs which will grow in very indifferent Soils, where the white Thorn will either not grow at all, or but very indifferently. But this is not the only Reason there is to value it. Nothing makes a stronger or a better Fence. But it is slow in its Growth at first: every Thing has its Advantages and Disadvantages.

I have seen old Holly Hedges in the Country make a very poor Appearance, and some grown quite out of Use; but so will Hawthorn, or any other, if neglected. The same Care that is required for others, is also wanted for these, and no other. If that be omitted, all the Hedges in the World will, after a certain Age, grow useless.

Holly loves a light and dry Soil: and it will live on the most barren. It has been said already of Furze; that it will grow on a dry Sand, or entire Gravel, the same is true of Holly: but between the two there is this Difference, that the Furze is the best suited to sandy, and the Holly to gravelly Grounds.

There is also another Kind of Soil, too common in many Parts of ENGLAND, this is the stony. In this the Hawthorn is starv'd, and the Roots even of the Furze are burnt up. The Holly will thrive and flourish upon this, and it is the only proper Shrub for a Fence on those Grounds. It may be used on many others, but no other can be used on some of these. It loves Warmth and Dryness about the Roots; and will grow almost upon a Rock.

The Farmer sees on what Soils he may, and on which he ought to use the Holly as a Fence. We shall now teach him the best Manner of raising, and preserving it in this Condition.

Holly is one of those Shrubs whose Seeds lie two Years in the Ground; but there is a Way of helping the Tardiness of this. The best Method of raising the Sets is this.

Gather the Berries when they are full ripe, and begin to fall from the Tree, and laying them upon a large coarse Cloth, rub them gently with another to break them, and wipe off the tough Juice from the Seeds. They need not be made curiously clean, but a great deal of this useless Matter may be taken off with little Trouble.

When the Seeds are thus clean'd, mix them with some dry Sand. Fill a large Garden Pot

with this Mixture, and digging a Hole in the Ground bury it there. Let them lie thus from the Autumn when they were gather'd from the Tree, till the Beginning of the SEPTEMBER following. Then take up the Pot; prepare a Bed of good light Earth, and sow the Seeds in it, covering them slightly with a little of the same Mould sifted over them. They will shoot the next Spring, and thrive, though it be slowly. They make very little Advance for the first three or four Years.

This is the Method of raising Holly; but there remains a Question, Whether it be best to have a little Nursery for this Purpose, or to sow them where they are to stand? This must be determin'd by the Soil where the Hedge is to be rais'd, for on that depends the Rule for the Choice. If the Ground be very poor and stony, it is best to raise them from Seed upon the Spot: if it be somewhat better, the best Method is to raise them in a little Nursery, such as has been before named, and to remove them at a proper Time from thence, to the Place where they are to remain.

But even in sowing them upon the Spot, some Cautions are necessary. If the Soil be of an exceeding barren stony Kind, the Seeds will be burnt up before they take Root. In this Case, let the Place mark'd out for the Hedge be plow'd up deep, to see if any good Mould can be rais'd from below. If not, the Farmer must be at the Expence of having a small Quantity of good Mould carried thither, and strew'd upon the Place, that there may be some Defence for the Seeds. After this, they are to be sown, as directed already, and a good and durable Fence of a dead Hedge is to be made on each Side, for it will be a considerable Time before the Plants grow up to be a Fence themselves.

When the Ground is somewhat better, and will give Nourishment to a transplanted Set, the best Way is to raise them in a Nursery, and keep them there till they are of the Thickness of one's Thumb, they are then to be removed to the Place, and carefully laid in, chusing a mild and moist Season. And for some Time after, they are to be shaded and watered, if the Season be dry and sultry to require it. They will thus take Root firmly: and if some of them seem to die, they must be cut off close to the Ground, and they will usually recover.

In this Case they require a dead Hedge on each Side, as well as when rais'd from Seed, for they are even thus a considerable Time before they come to their Strength, and while they are young and tender, the Sheep are very fond of feeding on them: when they are grown stronger, they need no Defence, for the Prickliness of their Leaves is sufficient.

Some when they plant a Holly Hedge, intermix white Thorn where the Soil will bear it. They plant four Sets of white Thorn, and one of Holly, and as the Holly grows, they pull up the Quick or white Thorn. The Use of the white Thorn is to raise the Fence the speedier. When the Shoots of this are all pulled up, if the Holly stand too thin, the Way is to lay down Layers from it where the Vacancies are, and thus it may be thickened at Pleasure.

When



When a Holly Hedge is raised by sowing, the young Shoots are to be thin'd, when they are two or three Inches high, leaving the straightest, stoutest, and heartiest; and after this they must be kept carefully weeded, and at Times it will be proper to stir and dig the Earth between them and the Hedges. This never fails to make them shoot out stronger immediately.

In this Manner may the Holly Hedge be rais'd with Certainty and Success. Its Fault is the Slowness of the Growth, and the Care that is requir'd to be taken of it while young. But this is all that can be objected to it; for in every other Respect it exceeds all other Fences.

No Hedge whatsoever is so beautiful; none so strong. When well grown, it appears as a Wall rather than a Hedge, and is altogether impenetrable by Cattle: and in this excellent Condition it remains a great many Years. We have observ'd already, that the Use of Hedges is not only for a Fence, but a Shelter for the Crop and Cattle. No Hedge whatsoever answers this Purpose equally to the Holly. An Eye cannot pierce, nor can the Wind blow through it. All within is defended as a Piece of Garden Ground, whose Fence is walling.

The Wood of the Holly when it grows to a certain Age, is also very valuable. The Cabinet Makers and Inlayers purchase it at a considerable Price: and of the Bark is made Birdlime. These, added to the Value of it in the immediate Article of fencing, make it surprising, that in a Country where in general it will thrive so well, it is so little planted. I hope these Observations, which are truly the Result of Experience, and confirmed by repeated Practice, will make it more common.

Where Thickness and Strength are required in a Fence, nothing answers the Purpose equally to the Holly, and it will grow to any moderate Height. The only Trouble is at first: and that is more with the transplanted Sets, than with the Shoots raised from Seed. These last require little more Regard than the black Thorn, or any other: and their only Inconvenience is, the Time of waiting for their growing to use. As to the Sets, if the Season prove unfriendly, they must be treated like Garden Plants, and be shaded and watered till they take Root, but after that they are no more troublesome.

It is odd, that Holly which is thus fitter than almost any Thing else for a Field Hedge, and is one of the unfittest that can be conceived for a Garden, should yet be in a manner in ENGLAND confined to the Garden, and neglected in the Field. But this is the Case; nor is there any Thing Custom cannot do.

The very Thing which gives it its Preference in the Field, is the great Objection to it in a Garden. This is the Largeness of the Leaves. These in the Field, fill and please the Eye, and thicken the Defence: they always appear beautiful here, because they never are cut. In Gardens they must be cut; for there every Thing is to be kept in due Form; and the cutting of a Shrub with such large Leaves as the Holly is improper, because they look so ragged after it.

Fancy has taught People also to be very fond of the Variegations of the Holly; and great

Pains are taken by budding and grafting to streak and edge the Leaves with white and yellow; these are esteem'd beautiful, but to a reasonable Eye, they have only the Aspect of Sickness. They may be called pretty, but to him who has seen a free growing Holly in its own strong and healthy green, with its Branches playing in wanton Luxuriance before the Wind, must think a strip'd cut Holly, a very miserable Improvement upon that beautiful Tree.

When the Holly Hedge is to be raised by Sets from the Nursery, the greatest Care imaginable must be taken, that the Season is not dry or cold. The End of APRIL, in the Midst of warm Showers, is the best Time of all. But it may be very well done toward the latter End of AUGUST, provided the Weather be cloudy, cool, and now and then showery. In these Seasons the Sets shoot out good Roots at once, and they seldom fail afterwards.



## CHAP. XX.

### *Of the Elder Hedge.*

WE have treated of the four principal, and most known, as well as most useful Shrubs for Fences; and we come here to the mentioning of one which at first Sight may seem of a very trifling and improper Kind: but there are Reasons for preferring on certain Occasions, Things that are in their general Use inferior. This we have shewn already, under the Article of black Thorn; which, though inferior to the white, may frequently be planted in its Stead to Advantage. In the same Manner, though the Elder be inferior to all that have been named, there are Occasions that may render it very proper; nay, more proper than any of them. It is fit the Farmer should know these, and the Nature, Use, and Value of this weak Shrub: that he may proportion his Choice to the Necessities of the Occasion, and to the Value of the natural Produce.

Elder then is neither so strong in its Branches, nor so close in its Growth as the white Thorn, black Thorn, Furze, or Holly; nor is it prickly as they are: all these Defects render it inferior to them all for a Hedge; for these are the great and general Requisites and Perfections of an Hedge Shrub: but there are some Occasions on which this Toughness of Branches, this Closeness, and Prickliness are not requisite; and in these the Elder may serve.

We are to remember also, that all these Shrubs so well fitted for hedging as they are, have their Inconveniencies; and Holly, the best of them all, particularly in the Slowness of its Growth. This, though in a less Degree, is also chargeable upon them all: but the Elder is the quickest of any in its shooting; and it will bear planting so large, and takes Root so easily, that it may be called an immediate Fence.

To this let us add, that the Flowers and Berries bear a Price at Market; and that the Wood of the old Stumps is valuable, and of sure Sale to the Turners: and we shall find that there



there is great Reason for naming the Elder among the Hedge Shrubs, for that it equals any of them in Value.

It has also another Benefit, that it is not so liable to be crop'd by Cattle, for they do not like the Taste of its Leaves. These are the particular Advantages of the Elder. It is true, that it is not proper for all Occasions, nor will grow on all Soils: on the contrary, it will answer only particular Purposes, and will take Root only in tolerably good Ground: yet wherever it will, nothing answers better.

Elder makes an excellent Fence for Gardens, because it is quick, ready, cheap, and affords so good Shade. In the same Manner where Fields are not liable to great Accidents; where the Banks are high and good, and the Cattle are used to be quiet in them, the same Shrub succeeds in the same Manner; for in the Consideration of Shade and Shelter, scarce any Thing exceeds it.

When the Farmer has pitch'd upon a proper Place for a Hedge of this Kind, he needs not have the Trouble of raising the Plants from Seed, nor of laying them with that expensive Toil and Regularity, as in the making up the Bank of Quick: the Elder will grow if any Piece of it be stuck into the Ground.

Let him cut a sufficient Number of Elder Poles, eight or ten Foot in Length, and of the Thickness of a Child's Wrist at the Bottom. These he is to stick into the Earth of the Bank, not upright, but slanting; and when he has placed a Row at convenient Distances, slanting one Way, he is to set another Row in the Spaces between the first, slanting the other Way; by this cross Direction, the Poles will form a Kind of chequer Work in Diamonds or Lozenges, and they may be secured, where necessary, by tying them at the Joints; and here and there fastening them to a strong Post.

No more than this is necessary, if the Soil be tolerably good: the Poles being thrust ten Inches or a Foot deep into the Ground, will take Root; and almost immediately they will begin to shoot, and the Leaves by their Bigness and quick Growth, will presently afford a perfect Shade and Shelter.

There is a great deal of Beauty to be obtain'd by the regular disposing of these Poles. In the plain Way already mention'd, the Diamond Work is very pretty: but by cutting some in shorter Pieces, and a proper Care in disposing and directing them in the Planting, they may be made into many of the Figures of those CHINESE Fences, which are so much admir'd in dead Work at this Time.

The best Season for making an Elder Fence is in the Beginning of MARCH: if the Weather prove dry, the Poles may be water'd half a dozen Times after they are stuck into the Ground, which will make them strike Root so much the more readily. They will need no other Care but cutting to keep them within Bounds; for they are of so very free Growth, that unless this be done, they will soon exceed their intended Compass: nothing however cuts so easily; and no Shrub bears it better.

I have named the Advantages of an Elder

Fence; 'tis fit therefore I name the Faults: for the Farmer, though he is to be told of Profits, he may not be aware of, is not to be tempted into a Practice that has Inconveniencies, without being fairly told of them. When he sees both Sides, he will be in a Condition to judge, which in any particular Circumstance he is to take.

I have already mention'd the Weakness of the Elder, and its Want of Thorns and Prickles; for this Reason it is not to be trusted where Cattle can be tempted to break through, for it will not prevent them. As the Holly is the strongest and most impenetrable of all Fences, this is the weakest and easiest broke.

Another Objection to the Use of Elder for Fences is, that the Bottoms grow naked after a few Years, and nothing is seen but gaping Holes. The first is a material Objection; and the only Thing to be said about it is, that the Elder is not fit in such Cases; but to this other, there is a short Answer, and a very easy Remedy. As the Elder grows so readily, what can be so easy as to stop these Gaps by fresh Plants, as soon as they appear. Nothing more is necessary for this Purpose, than to cut off some strait Sticks from the Trees where they can be spar'd, and plant them in the lower Part of the Bank, with their Tops just reaching to the naked Place. As the Planting of these Sticks is nothing more than thrusting them into the Ground, nothing can be so easy as this Practice, and nothing can be more certain, than that it will prove a successful and certain Remedy.

Though the Flowers of the Elder, as well as the Berries, are useful in Medicine, yet they have so strong and particular a Smell, that they are disagreeable to many People; and are apt to give some Headachs. This is an Objection against the Elder, when there is any Thought of planting it very near a House. But it is an Objection that reaches no farther. The very Wood, Leaves, and young Shoots of Elder, have all a disagreeable Smell also, but this is not unwholesome.

As the Berries of the common Kind of Elder are black when they are ripe; there are some Kinds which have them white, and others on which they continue always green, even when mellow; but these are trifling Variations, and little worth Regard. On the contrary, there is a Kind of Elder that differs from the others in the Leaves, and is worth the Planters Notice. I don't mean by this, those idle and sickly Variations of the Elder, with Leaves spotted with white, or streaked with yellow, and kept in Gardens for their supposed Beauty: the Kind I mean here is, that Elder which has the Leaves finely cut into small Divisions. One meets with Trees of this here and there in most Counties of ENGLAND: and I would advise the Farmer to plant a Parcel of these by way of Stock, whenever he shall find it convenient to have an Elder Fence; for this Kind of Elder has always more Branches than the common Sort, and when any Thing harden'd, they are stronger. The Leaves also are much more beautiful than the common Elder Leaves; and the Wood of this Kind is more solid than that of the other; and is preferable



able to Box for many of the fine Works in which Elder is used by the Turners. People, while they are taken up with the Regard of a painted Leaf, do not attend to these real and useful Distinctions.

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### C H A P. XXI.

#### *Of the Use of the Crab, Sallow, Bramble, and Alder in fencing.*

**W**E have now gone through the Consideration of the several Shrubs which are commonly used in Fencing, but there remain four others to be treated of, which, though seldom used alone for that Purpose, yet as they assist, or answer the same End on different Occasions, ought to be named here.

As to the first of these the Crab, I have, in some few Places, seen entire Hedges of it; and they are very beautiful for the Regularity of their Growth. They give the Inclosure also the Look of a Garden when they are in Blossom; and have a pretty Effect when in Fruit. Neither are they without their Value, for the Wood is hard and serviceable; and from the Fruit is made Verjuice.

But with all these Advantages of Use and Beauty, I do not advise the making entire Hedges of it, for I have seen by Experience, that they are neither so good for Shelter or Fence. The Leaves of the Crab are indeed larger than those of the white Thorn, but they are not nearly so numerous; and the same is to be observed of the Branches. Now the great Quantity of Branches and Leaves, is what gives the white Thorn the Preference above all other Shrubs for hedging.

When the Farmer shall chuse whether it be from Fashion or Whim, to have an entire Hedge of Crab, his Method is to be exactly the same as has been described for the white Thorn. Let him first set apart a Piece of poor Ground for a Nursery. Let him there sow the Seeds of the Crab, with the pulpy Part of the Fruit about them. And they will shoot quickly, and grow speedily in good Shape.

When these Plants are of the Thickness of a Man's Thumb they are fit for Service: they must then be taken up, the Bank prepar'd, and the whole managed exactly as in the making a Quickset Hedge of white Thorn. This is the Method to make an Hedge of Crabs alone, but it is what I would never advise the Farmer to do: the best Way of using this Shrub is, by mixing it with white Thorn in the Quickset, when the Bank is made.

For this Purpose I would have the Farmer always, in his little Nursery for his Hawthorn Sets, have some Crabs rais'd from the Seed, as already describ'd. Let these be taken up, together with the white Thorn Sets, only in a small Number; and laid in just as the Quicksets are. About one in every twelve, or fifteen Foot, will be very proper. They will thus grow up with the white Thorn; they will shew very beautifully in the Intermixture, when in Flower, and when in Fruit; and the same Use may be made of the Fruit for Verjuice; there will be a sufficient Plenty of them for any moderate Use.

N<sup>o</sup> 11.

Some plant a Sallow among the Quickset, at every fourteen Foot, in the Manner that the Crabs are here directed to be laid in: and in proper Soils this does well. It is of the Willow Kind, and therefore loves Moisture, though it does not require so much as the common Willow. It is prudent therefore to plant this more plentifully in moist Meadow Fences, where, by its quick Growth, it is of considerable Advantages.

Brambles, or Blackberry Bushes, are so far of the Nature of the Furze, that they will grow upon a very poor Soil: but it is not the Custom to make Fences of them alone: nor are they fit for it, because of the Length and Weakness of their Branches, which is such that they cannot keep themselves upright. They are of good Use planted on loose Banks, to defend them from being over-run and trampled down by the Cattle. They also may be us'd to stop up Gaps in the Bottoms of Hedges, that with Age begin to grow bare in that Part. They may be rais'd with great Ease from the Seed; or Cuttings of them, will grow readily. The only Use they are fit for is, what has been just named, but that is not sufficiently regarded: Nature very often supplies the Defects of Hedges with Brambles; and 'tis a Shame that Art does not imitate them in this as in many other essential Articles.

Last in this Division of our Work, we come to name the Alder. This is a Water Shrub, and its Use in Fencing is of a very peculiar Kind. It defends the Sides of Meadows against being wash'd away by swift running Waters. The Alder never grows so well as by the Sides of these Rivulets. The swift Streams of these frequently undermine their Banks, especially at the Turnings: but the Roots of a good Alder are a sure Defence.

There is scarce any Shrub whose Roots are so numerous or stout as those of the Alder. And it is always sending Suckers from the lowest Roots; so that where there is ever so swift a Current, and ever so many Turnings follow one another, nothing more is needful to preserve the Ground but to plant a sufficient Number of Alders. In many Places also, where the Course of the River is ever so strait, the Soil of the Meadow is so loose and mellow, that it is continually washing in, and the Water is widening its Channel. Here the Alders are of the same Use: being planted along the strait Bank, they preserve it excellently.

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### C H A P. XXII.

#### *Of the Bank Fence, with its Plantation.*

**I**F our Intent were to recommend to the Farmer the Bank Fence alone, and naked, as it is used in some Places very commonly, we should have inserted the Rules for making it just after the ditching, leaving the Plantations of the Quicks to introduce that of Trees. But the Bank alone is a poor, raw, and ugly Fence, compared to the Bank with its Quick or Plantation: this is therefore its proper Place. The Manner of planting Quick has been shewn already: The Husbandman has his little Nursery of

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Sets



Sets ready, and that not only of Quick or Hawthorn, but of the Crab, Sloe, and whatever other Shrub useful in fencing, is to be transplanted into its Place. We have now therefore only the making of the Bank to describe; and the Manner of disposing those Sets which are ready rais'd, and of a fit Size.

The Bank is most proper, as an Inclosure, for Meadow and Pasture Grounds; and the Husbandman should first consider the Nature of the Soil, before he attempts to raise it. Two Necessaries should recommend it to him; the first, that it may be made cheap, the other, that it may flourish; and both these depend upon that single Consideration, the Soil.

An Earth that will cut easily and freely by the Spade, and is cover'd with a good thick fresh Turf, is the only one fit for this Purpose, nor let him ever have the least Thought of raising it on any other. I speak not of those Banks of Clay or Dirt that are rais'd only by digging a Ditch, and piling up the Earth, and leaving it naked: but of the fine green Bank Fence which is used in some Counties, and deserves to be used in all; which is beautiful and profitable; and remains firm, when once well made, for ever.

When the Husbandman finds in his Meadow or Pasture Ground such a Soil, so cover'd as just mentioned, let him set about the raising his Bank in the Beginning of the Spring, and at a Time when there have been moderate Rains. In very wet Seasons the Earth of this Kind works untowardly, and in long dry Weather it is unfit; for it not only crumbles too much, but if the Bank be rais'd at such a Season, the Earth will swell and burst, after the next Rains.

Having chosen then a proper Spot of Ground, and a fit Season, the Work is to be executed in this Manner. In the Place where the Bank is to be rais'd, draw a couple of even Lines, at three Foot and an half Distance all the Way from one another. Then begin to dig up Turf in a Place cover'd with good strong and fresh Grass. Cut these Turfs a Span deep, of a long square Form, and of such Bigness as they may be most conveniently managed: as these are cut up let them be laid in two Rows, one along the Edge of each of the two Lines, with the grassy Side outwards. They will lie thus in two Rows, with a Space between them.

A Foot distance from the outermost Row, not that which lies toward the Pasture, open a Ditch three Foot wide. Let it be dug sloping, so that its Sides descend with a small Slant, and carry it to such a Depth as shall be necessary to supply a proper Quantity of Earth to make up the Bank, between the present and succeeding Rows of Turf.

The Earth which is dug up in this Ditch, is to be put in the vacant Space between the two Rows of Turf, just named, till it is brought to a Level with them. The Foundation of the Bank is thus laid, and it will be continued easily.

More Turf is now to be cut like the former, and a second Row on each Side is to be laid on the former, very carefully; placing it even, but a little inwards; for the Bank is to be rais'd all the Way with a Slope, so as to be broadest at the Bottom, and somewhat narrower all the Way to the Top.

A second double Row of Turf being thus laid, the Space left between them is to be fill'd up evenly with more Earth out of the Ditch: and the Surface well press'd down with the Spade: and left perfectly level, to receive the third Row of Turfs, and the Earth between.

No more Direction is needful for the raising of this Bank, than that the Work is to be continued in the same Manner, laying on more Rows of Turf on each Side, and filling up carefully the Space between with Earth; and continuing it slanting all the Way, till it is four Foot high, and at the Top its Breadth is two Foot and a half, one Foot being decreased in the Height.

The Space left between the two last, or top Rows of Turf, is not to be fill'd up so perfectly as that between the others; but the Top of the Bank is to be finish'd with a slight Hollow.

When the Bank is thus rais'd plant the Quicksets upon the Top. Let them be taken out of the Nursery at a proper Size, and set a Foot deep on the Top of the Bank. They may be of any of the before-mentioned Kinds that bear transplanting, as Crab, white Thorn, or Sloe, but in general the white Thorn is best. It may be diversified here and there with the Crab, or Sallow, but no Timber Trees, or large growing Fruit Trees are to be planted among it.

The Quick will flourish better in this than any other Plantation whatsoever. The Hollow at the Top of the Bank, which is still to be preserved in the Plantation, will detain the Rains, and send them down to the Roots of the Quick: and there is a fine Bank or Bed of Earth for them to grow in, which is thicker all the Way down, and has been just well stir'd and broken; so that it is in the fullest Perfection for supplying the young Growth with Nourishment.

When the Bank and its Plantation are thus finished, a small dead Hedge must be made on or near the Top, to keep the Sheep from running up and nibbling the young Quick. These Hedges need not be above fourteen Inches high, and no Matter how slight: for they will soon be needless; the Quick growing very fast, and the Bank becoming every Day more and more firm, by the joining of the Grass Roots from the several Turfs, so as to be in no Danger of Hurt from their Trampling, or indeed from any Accident whatsoever.

In the Autumn following let the Husbandman go over the Hedge, Bank, and Quick, with his Eye, to repair what may be amiss, it is very rarely that any Repair is wanted, but if there be the least Damage it should be supplied, for this is so beautiful a Fence that it is unpardonable not to keep it entire.

If there be any Defect in the Hedges, let them be supplied with some small Bushes of black Thorn: if any Turf in the Bank look decaying, or its Grass become yellow, let it be supplied with a fresh one cut from the same Ground: and if any of the Quicksets have fail'd let them be replac'd with others, that all may be without Blemish.

It is proper to look over the Work, to see if any of these Accidents have happened: that if they have they may be supplied in Time, but it  
very



very rarely happens that any do. In general, if the Fence have been made according to these Directions, it continues without Fault, and improves every Day, both in Strength and Beauty.

The Rains that fall about this Season of the Year, supply both the Turf and the Quick with Moisture; and while the former shoots briskly, the other continues in its Verdure. The fresh Roots of the Grass which are continually pushing every Way, join the several Turfs together in such a Manner, that they quickly form one Body, not a Joint being any where seen: and in a little Time the Roots of the white Thorn, spreading through the whole Substance of the Bank, bind all firmly together into one tight and solid Body, that nothing can injure it. The Grass continues to grow freely on the Slope of the Fence, and it is a Beauty: the crowning also of the Hawthorn, varied with the other Shrubs, which always look fresh and healthy, adds to the Grace of the whole, and makes it far exceed any other Fence whatsoever.

If the Ground be Pasture on both Sides the Fence; instead of a Ditch on the Outside of the Bank, the Earth on each Side may be lower'd with a Slope of two Foot deep. This will answer the Purpose of the Ditch, in supplying a Quantity of Earth to fill up the Spaces between the Rows of Turf, in making the Bank; and will answer two other Purposes. In the first Place, the Bank from four Foot will be made, by this Lowering of the Ground at its Foot, a Fence of six Foot high, beside the Hedge at the Top: and then no Ground will be lost for the Pasturage, because this hollowed Place will bear Grass like the rest; and so will the Sides of the Bank, which will, in good Seasons, be as green as any Part of the Inclosure.

If the Circumstances of the Place, or other Accidents, require the Fence to be higher, the Husbandman must begin with a broader Foundation; and must cut away the Ground more at the Foot, or dig a deeper Ditch for a Supply of Earth: no more Difference is necessary, for the Method of carrying up the Bank is exactly the same: and the higher and larger the Bank, the better the Quick will grow.

No Hedge whatsoever affords so fine a Shelter to the Growth, or to the Cattle, as this Bank with its Plantation. It must be consider'd indeed, that the Shrubs stand more exposed to the Winds on it, than on any other Plantation; and for this Reason they should not be left to grow too large. Some clip the Quick upon these Banks, which is a very good Method, for it at once thickens the Body, and keeps it in due Compass: and though, in general, the clipping of Trees be a very ridiculous Invention, it may be allowed, in this particular Case, with Use and Propriety.

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### C H A P. XXIII.

#### *Of the Wall Fence, with its Plantation.*

WITH respect to the Wall Fences of Fields, the same may be said as has been already observed of the Banks, that although

they are frequently used singly and naked; yet they never have half their Beauty, or half their Value, when they are so imperfectly made. Their Plantation giving them their greatest Advantages and Superiority over the other Kinds.

In many Parts of ENGLAND Stone is so common, and lies so ready, that it is the common Material for Fences: Walls, in the Way they make them in such Places, coming surprizingly cheap. We shall first speak of the most common Fences of this Kind; and afterwards of the better Kind.

The most rude and vulgar Fence of Stone, is the Wall they build about their Lands in NORTHAMPTONSHIRE, and some other Counties, which, in the same Manner, yield that Sort of rough Stone us'd for this Purpose, near the Surface of the Earth; so that there is little Expence in digging, and in so many Places, that there is almost as little in carrying and laying it. In these Places they lay a Parcel of these rough Stones in the irregular flattish Shape in which they naturally rise in digging, upon one another, without Mortar, till they have rais'd what they call a Wall. This is so loose that in many Places you may see through it: and as where the Eye can pierce, the Wind very well may, these Walls are but a very indifferent Kind of Fence by way of Shelter; nor indeed do they deserve a much better Character in any other Respect, for they are so ill put together that they are frequently tumbling to Pieces. 'Tis true they are easily repaired again; for nothing is requir'd but to lay up the Stones in their Places; but when the Walls are made, as some are that I have seen in that and the adjoining Counties, the Work is endless.

The second Kind of Walls I shall mention, are such as are found upon the Grounds of more careful Husbandmen in the same Counties. These are made of the same rough and irregular Stones as the former, pil'd up on one another in the same Way, without Mortar; but then they are laid so much more carefully, that the Wind does not blow through them in so many Places; and the top Stones are laid in Clay by way of Mortar. Their own better Disposition in the Body, and this little strengthening at the Top makes these much superior to the former: they defend the Crop and the Cattle better, and they are not so continually tumbling down. The Difference of Labour in the building of these Walls is so trifling a Consideration, in respect of their Superiority over the others, that I have been surprized in looking over the Fences of those Counties, to see so many of the former, and so few of these. The one tumbling down every where, and the others tolerably firm.

A farther Improvement of these rough Walls I have seen in some few Places, which was by throwing in a Quantity of tough loamy Earth among the Stones, as they laid them in the Wall. This was a rough Imitation of laying the Stones in Mortar; and adds but a little to the Expence, while it encreases vastly the Goodness of the Fence. A Wall of this Kind, with the great Spaces filled up with Loam, and the Top tolerably laid in Clay, will stand a vast while, and answer the great Purposes of a Fence better



ter than either of the former, by many Degrees.

It may be natural enough to suppose, at first Sight, that the Wind blowing through the Holes in these rude Walls, would be no more Hurt to the Cattle that shelter under them, than that which comes through the Bushes in a common Fence: but Experience shews it is much more mischievous, and the Occasion of it is plain enough in Reason. The Wind that blows through Bushes comes broken and in a weak Manner; but that which issues in at a Hole in a Wall comes with a Draught and Current.

In the more northern Counties of ENGLAND, where there is Plenty of a more regular flat Stone, they build their Fences of this Kind better in Proportion: in some Places, where the Stone naturally rises in large flat and tolerably even Pieces, a Wall built of these without Mortar, and only top'd with some very smooth ones, laid in Clay or clayey Loam, stands a great while, and must be confes'd a good Fence for all the Purposes of Inclosure, Defence, and Shelter.

A much better Fence may, however, be made in any of these Places, even where the Stone is worst of all, upon the Principle of the Bank Fence, described in the foregoing Chapter. This is what I shall recommend to the Husbandman, where he has the proper Materials.

To this Purpose let him chuse the evenest and most regular Stones he can conveniently meet with, for in those Places they are often as ready at hand as such as are worse. The Preference is not so great in the making this Fence, as in the raising a single Wall; but the evenest the Stones the better, and it is worth while to be at some Care in every Circumstance, about a Fence that is to be at once so beautiful and so lasting: for in both Respects this exceeds most others.

When he has provided himself with Stone, let him dig up the Ground a little Depth for a Foundation, and open a Pit, or Ditch, in some Place near, whence he can have a Supply of Earth as he shall want it, in carrying up the Wall. When thus prepared let him set to work.

He is to make, as it were, two Walls in one, laying the Stones one upon another, first two and then one between.

As the Wall is carried up, the Space between is to be fill'd up with the Earth dug out of the Foundation, or from the Ditch or Pit open'd for that Purpose. This brings all the Work into one Mass, and adds Strength and Firmness.

The Stone Work is to be continued in this Manner, and fill'd up with the Earth to such Height and Breadth as is necessary, according to the Circumstances of the Place; and from Time to Time the Stones are to be beat in flat at the Sides, which gives the Work great Strength, as well as Regularity of Appearance.

When the Wall is thus carry'd to a proper Height, let there be Quicksets of any Kind planted upon it, in the same Manner

as has been directed about the Bank Fence. These will grow and flourish excellently, and there is something in the Aspect of a Wall thus crown'd with a thriving Hedge of Shrubs that is particularly pleasing.

This is the finest, best, and most lasting of all the Stone Fences; nor is it a mere Proposal from Fancy. These Kinds of Walls are not uncommon in many Parts of the West of ENGLAND, and they there plant not only common Hedge Shrubs, but Ash, Elm, and other Timber Trees upon them. To this indeed I object, because the Force of the Winds upon such Trees, when they are of any considerable Growth, is too much to be trusted, where the two Walls are to stand the Stress of it: I have seen a very well made Fence of this Kind torn to Pieces for eighteen Foot length, by the blowing down of a middling Ash that stood upon it: when the Trees are larger, the Danger is greater in proportion: nor is it either needful or proper to run the Hazard.

What I would advise is, to plant the Top of the Wall with white Thorn Sets, taken at a proper Age from the Nursery; and for Variety, to add a Crab every twelve or fourteen Foot; for both the Flowers and the Fruit of that Shrub give a pretty Variety.

The Crab I have all along recommended to be intermixed in the Plantations of white Thorn Hedges; and its Beauty, which is some Recommendation, is not the only Advantage. Where that Shrub is left to itself, there is that Benefit of its pleasing the Eye, but in whatsoever Fence it is used, it may be train'd up to answer other and better Purposes.

No Stock whatsoever is equal to the Crab for the grafting of Apples; and in Places where Custom has established the Property of these Fruits in Hedges, this should be always the Use made of the Crab Shrub; for where People have been us'd to strip Fruit Trees in Hedge Rows, they will not only take the Fruit, but break and tear down a great Part of the Hedge to get it.

In such Places therefore the Crab is to be left to itself, and the Husbandman must be content with pleasing his Eye with its Blossoms, and with gathering its Fruit for Verjuice. In other Counties, where Fruit stands quietly in the Hedges, he is to order his Crab Trees in the following Manner.

Let him prune them up every Season, till they are above the Reach of Cattle, and then let him engraft them with the most useful and valuable Kinds of Apples. The Way of doing this in the easiest and surest Manner, will be shewn hereafter, in its proper Place, when we come to treat of the Orchard: it is only named here as a Part of the Care of an Hedge.

Nor should I omit to mention the Practice of a Gentleman in DEVONSHIRE, who on one of those double Wall Fences, that had Earth between rais'd Apples instead of Crabs, at certain Distances between the white Thorn: it was a Matter of Curiosity more than Use; for the best Method for those who intend to have Apples in their Hedges, is to raise Crab Stocks, and



and graft them : but as it succeeded to his Wishes, I shall mention the Method.

Instead of Crab Seeds he sowed the Kernels of some good Kinds of Apples in his Nursery; and when he planted Quickset upon any of his Walls, he placed one of these young Apple Trees at every twenty Foot. He took out an Apple Set of at least three Years Growth more than the white Thorn Sets were, so that it had the Advantage of them in that Respect; and he planted these with a particular Care, and pruned them up with his own Hand, so as to give them all possible Advantages. The Consequences of this was, that he was always able to shew Apples that the

most experienced Cyderman did not know how to name. The Shoots from Seeds in all Vegetables, are those that yield the Varieties; and by raising all these from Seed, and by the Benefit also of the peculiar Situation in which they were planted on these Wall Fences, he never fail'd to have here and there what they allowed to be a new Kind. Some of these he brought afterwards into his Orchard with Success. This however was little more than Curiosity: for as to Use the Graft Kinds always bear sooner; and in that Practice a Man is sure of his Kind, whereas in this other Method all is Hazard.

End of the T H I R D B O O K.







# COMPLEAT BODY OF HUSBANDRY.

## BOOK IV.

*Of Coppice Wood, and Timber Trees. In THREE PARTS.*

### I. Of COPPICE and other SMALL WOOD.

#### CHAP.

1. Of raising a Coppice from Seed.
2. Of raising a Coppice by planting of Sets.
3. Of the managing and ordering a Coppice in its Growth.
4. Of felling of Coppices.
5. Of Pollards, or Trees for Shrowding.

### II. Of the Management of TIMBER TREES.

6. Of Timber Trees in general.
7. Of raising Timber Trees from Seed.
8. Of propagating Timber Trees by Transplantation.
9. Of transplanting Trees of a large Growth, and at improper Seasons.

### III. Of the several Kinds of TIMBER TREES.

10. Of the Oak.
11. Of raising the Oak by Transplantation.
12. Of raising the Oak from the Acorn.
13. Of the Uses of the Oak.
14. Of the Growth of the Oak.
15. Of the felling of the Oak.
16. Of the seasoning Oak, and judging of the Timber.
17. Of judging of the Oak as it stands.
18. Of the Elm, its Kinds, and proper Soil and Situation.
19. Of the Propagation of the Elm.
20. Of the Uses of the Elm in Plantations.
21. Of the Value of Elm in Timber.
22. Of the Ash, its proper Soil and Situation.
23. Of the Propagation of the Ash.
24. Of raising Ash in a Nursery.
25. Of raising Ash, where it is to stand.
26. Of lopping and felling the Ash.

#### CHAP.

27. Of the Uses of the Ash, its Value in Plantations, and as Timber.
28. Of the Beech, its Soil and Situation.
29. Of the Propagation of the Beech.
30. Of the Uses, and Value of the Beech.
31. Of the white Poplar, its Soil and Situation.
32. Of the Propagation, and Uses of the white Poplar.
33. Of the black Poplar.
34. Of the Aspen Tree.
35. Of the Sycamore.
36. Of the Lime Tree.
37. Of the Walnut Tree.
38. Of the Horse Chestnut Tree.
39. Of the Chestnut Tree.
40. Of the Service Tree.
41. Of the Quickbeam.
42. Of the Birch.
43. Of the Hornbeam.
44. Of the Maple.
45. Of the Cherry Tree.
46. Of the Pear Tree.
47. Of the Hazel.
48. Of the Buck Thorn.
49. Of the Alder.
50. Of the Willow.
51. Of the Ozier.
52. Of the Sallow.
53. Of the Fir Tree.
54. Of the Pine Tree.
55. Of the Juniper.
56. Of the Yew.
57. Of the Box.
58. Of the Cypress.
59. Of the Cedar.





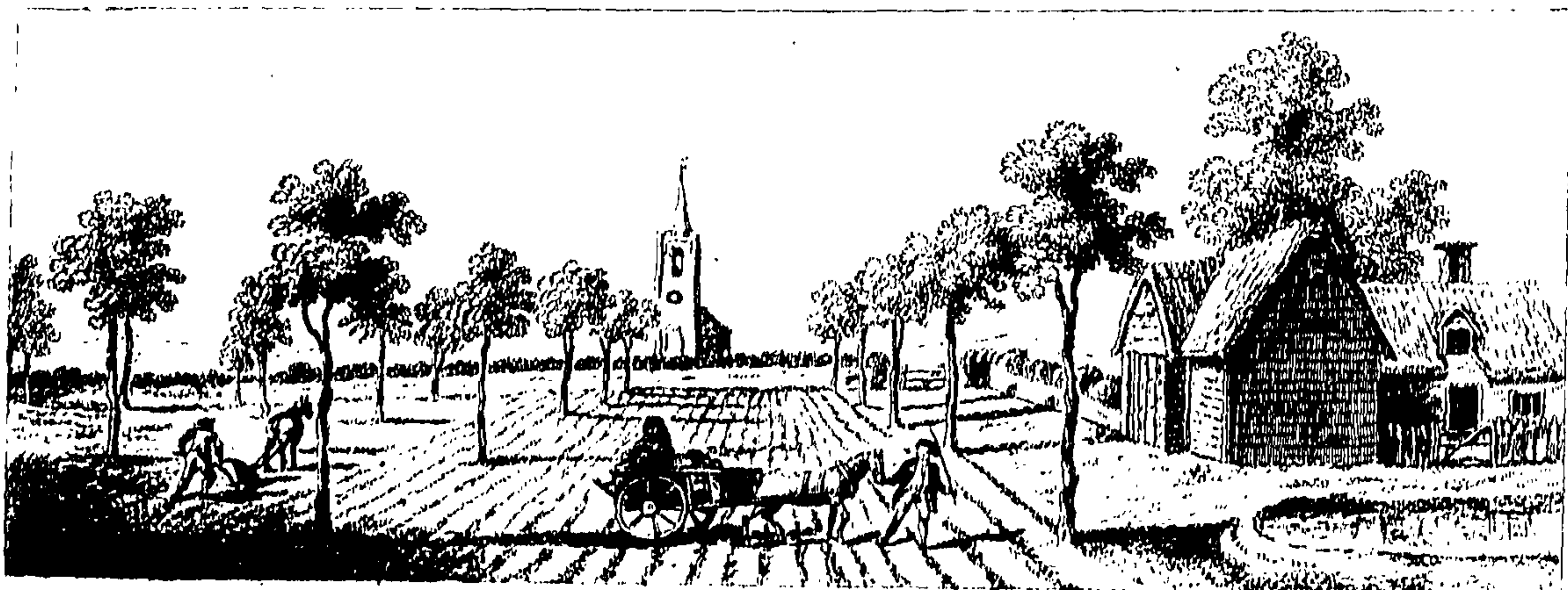
*The Wall Fence planted.*

*The Bank Fence planted.*



*Coppice Wood raised irregularly.*

*Coppice Wood regularly planted.*



*Timber Trees raised in Rows, with the Ground tilled between.*



# The INTRODUCTION.

## Of the Improvements made by Planting.

**T**HE planting of Hedges, and of the Fruit and Timber Trees occasionally interspersed among the Shrubs composing them; leads us naturally to the raising and planting of Trees, and Shrubs in general. Our Business throughout this Work is to inform the Husbandman how he may increase his Profits, and improve the Farm which yields them: and in nothing can that be assisted, more than by judicious and orderly Plantations of Trees.

This will be the Subject of our present Fourth Book, and we shall begin with the raising, managing, and felling of Coppice, or, as it is commonly spoken, Copse Wood, because that is nearest of kin to the Hedge Shrubs last treated of; and thence going from lesser to greater, we shall advance to the Culture of Timber Trees.

There is no Step the Husbandman can take in Planting, provided it be done with Discretion, that will not add to his yearly Income; or that will not be an enriching of the Land: and there is this farther Consideration, that all he does in this Way gives also Pleasure. It increases the Beauty, as well as Value of the Ground; and his Eye shares the Advantage with his Pocket.

It is the peculiar Happiness of these Plantations that all Soils will bear them. There are Lands too wet and too dry for Tillage: for there are some such as it is impossible to improve. These are the few really barren Lands of ENGLAND, yet on these Trees of one Kind or other will grow. They are to be suited properly to the Soil, and the Exposure; and this done, they yearly increase in Value, and afford a Shelter and Defence to the Grounds, that before wanted it: thus extending their Influence beyond what rises simply from their own Value.

In many Parts of NORFOLK, there are Valleys naturally rich and fertile, but lying at the Foot of sandy Hills, they are overwhelmed with that barren Material by every Wind, and violent Shower. Of late they have in some Places begun to sow upon the Sides of these Hills, FRENCH Furze. This grows so well, that once in three Years it is cut for Fuel, and sells at a good Price; and all the Time it fixes the Surface, and preserves the Meadows below. What pity that a Practice so doubly beneficial, should not be universally follow'd.

As there are Shrubs appropriated to the driest Sand, so are there also to the moist wet Side of a River. These will be describ'd in the succeeding Chapters; and it will be shewn, that no Piece of Ground whatsoever need be left unus'd, since some Tree or Shrub will grow on it; and the very meanest of them will yield very considerable Profit.

The Benefit of Plantations, whether of Shrubs or Trees, is not confin'd to this present or immediate Advantage: they improve the Land on which they grow; and the Planting a Copse upon an unfruitful Piece of Ground, is an excellent Method of improving the Soil. This I have

had Opportunity of seeing in my own Neighbourhood, where one of the barrenest Spots in the Parish after yielding a great Profit from the Coppice Wood rais'd upon it, became a very good and fertile Field upon the stubbing up the Roots; and continues so to this Day.

Where Land is so indifferently fitted by Nature for Corn or Grass, that it requires a great deal of Expence in manuring to produce a tolerable Crop, it is often better to plant it with Coppice Wood, for the annual Profits will be much greater, and the Expence in a manner nothing. There are also Pieces of Ground situated so unfortunately, that they are too remote from the Farm, or from the Sources of the Manure, and Tillage; these cannot be dress'd for Corn, but at a great Expence, because of the Carriage of the Materials: here therefore is another Reason for planting; and the Success is certain; and the Profits greater than any will believe who have not Experience.

The Land Owner is greatly concern'd in this. In how many Parts of this Kingdom are there Lands, that cannot be let for more than Five Shillings an Acre, and that from their Soil, Situation, or some other Accident, will not yield the Farmer any Profits at a larger Rent. How much must it be to the Advantage of the Owner in this Case, to plant them with Coppice Wood. At twelve Years Growth the Wood may very well be worth twenty Pound the Acre; and at a second felling but seven Years afterwards as much: for the Roots being more establish'd shoot faster.

There is greater Security of the Profits also in this, than in the common Articles of Husbandry, for Crops will fail sometimes, and Stock will die. Here Nature does the whole Business, and is above the Reach of Accidents: nor is there any Difficulty in making, after a proper Growth, the Profits annual, and as regular as by any other Course. Suppose a Coppice of thirty Acres be planted and divided into ten Parts, one of these may be felled every Year: and by this Management every Year will yield three Acres of ten Years Growth.

A little Management in these Things is all. The Husbandman who sets out without it, will be perplexed with the least Difficulties, and overturn'd in his Designs by the slightest Disappointments: he who sets out properly will overcome the greatest.

The Husbandman who shall see the Profits of this Practice, is not to suppose that because barren Lands will bear Coppice Wood, only barren Lands are fit for it; nor is he to grudge the putting such as are better, nay, even the best to this Service; or suppose the Price of the Rent will be a Drawback over-proportion'd to the Advantage: the Truth lies in just the contrary, for though bad Land will bear Wood; good Land will produce it much better, and the Growth will be quicker; so that the Benefit will be many Times over greater than the Cost.

The better Land is that is planted, the larger will be the Profit. I have read with Surprise, of a Plantation upon a tolerably good Land, that at eleven Years Growth afforded Wood to the Amount of sixty Pounds an Acre: but I

have



have now seen it verified. A Piece of good Ground planted with flourishing Sets, will yield at eleven Years, Pole Wood, and Spar Wood, and some Quantity of small Building Timber.

The raising of Coppice Wood and Timber Trees in Woods, is not the only Advantage to be made by planting. There is scarce any Place where some Tree or other may not be set, and there is none that does not bring its certain Advantage. Trees planted in odd waste Places, Trees of Avenues, and those in the Hedge Rows, set as before advis'd with the Quick, all yield a certain and a regular Profit. Every Man is a Gainer who sets them.

The Time taken up in the Growth of Wood, is one great Objection, it requiring forty, fifty, or more Years to bring many of the Timber Trees to a Condition for felling to Advantage; but though slow, it is certain. Who would grudge to set a Plant that costs him in a manner nothing, and that without requiring any Care or Trouble, will in fifty Years be worth four, five, or six Pounds. Who would grudge the Trouble of planting a Thousand such, which should at the End of that Time be worth a little Fortune. What an easy Way of adding five or six Thousand Pounds to an Estate: and where it is of any tolerable Extent, what is the Difficulty of adding instead of five or six, fifty or sixty Thousand Pounds this Way.

Indeed nobody grudges this Trouble, but all neglect it. Men do not look into these Things till a certain Period of Life; and then they are not to expect to live till the Time of reaping the Advantage. Perhaps not: but why should they deny this Benefit to their Heirs! is there any Way so easy of raising Fortunes for younger Children. It is so easy and so certain of Success, that 'tis a Crime to neglect it: and the Nation as well as Families suffer by the Fault.

But to those who are so selfish, that they will not speak a Word, or give an Order for their Heirs, the Plantation of Coppice Woods may be recommended as warmly as any other Practice whatsoever; because they may reasonably enough, at almost any Period of Life, expect Time to reap its Benefits: and these, although not so great as those from Timber Trees, are enough to tempt the coldest Imagination, that is once inform'd what they truly are.

As to the Plantations for longer Growths, every Day gives us Instances of their Value. Things intended only for Ornaments to Estates, becoming in this Course of Time great Additions to them. How common is it to see the Trees of a long Avenue, which were planted only to please the Eye, of such a Value, as

warms the next Heir's Heart when he thinks of them. Others might as well have been planted, says he, in waste Places, as these for Ornament; and he is ready to curse his Parent who did not do it. Let him take Care to do for his Son, what would have been so acceptable to himself.

Between these Timber Trees and the Coppice Wood, may be mention'd another Kind, those that are set for shrowding. The Ash, and many other Kinds, serve very profitably for this Use, as shall be shewn at large hereafter. In general the Trees that are of quickest Growth are fittest for this Purpose; and for the rest, they must be suited to the Soil, the Willow and Poplar for moist Places, and so the others as they naturally require.

These are to be planted by Ditch Sides, in Hedge Rows, and on waste Grounds: and they are to be shrowded according to their several Kinds, at six or eight Years Growth. After this they constantly bear a good Head, and the Shrowds increase for every following cutting. In the mean Time they are secure from Injuries of all Kinds, and need no Fences.

As the Shrowds are principally used for Fire Wood, the Profit arising from these Trees is greatest where that is scarcest; but there is no Place where it is not enough to make it very desirable.

I have hinted before, that beside the immediate and proper Value of Trees in Woods, Coppices, Hedges, or single; they add to the Value of the Land about them, and this is seen every Day, and confirm'd by universal and continual Experience. Indeed there is no Wonder it should be thus; for we see Hedges of vast Use by their Shade and Shelter. Woods, when they stand on the Edge of some Piece of Land, that would otherwise be exposed to destructive Winds, must be of greater; because being thicker, they are a more certain Defence. The single Trees, and those in Hedge Rows, afford Shelter for Cattle against the Winters Storms, and the Summers Heats; in either Plantation they afford the Husbandman Timber for his necessary Occasions; for the Repair of his Buildings, and his Implements, and for his Chimney. The Mast bearing Trees yield Food for Swine; and, in fine, there is not one, the meanest of any Kind, that has not its secondary Uses.

Finally, The Necessity of Wood where there are Iron Mines, and those of other Metals, is sufficiently known. Nothing is so easily rais'd as Wood, and no Soil but will bear it, why then will not those who are so deeply interested in its Growth, raise it in such Places.



## B O O K IV. P A R T I.

*Of Coppice, and other Small Wood.*

## C H A P. I.

*Of raising a Coppice from Seed.*

WE have in general propos'd the Division of Plantations according to their Kinds, into Coppice Wood and Timber Trees, and are to treat of them separately, because they require in many Respects a distinct and different Management. We are to enter first on the Consideration of the smaller, and after to advance to the larger Kind; our first Business therefore is to deliver Rules for the raising the Coppice Wood.

This may be done two Ways, by sowing or by planting. We shall lay before the practical Husbandman, these several Methods, with their Advantages and Disadvantages; and direct him in his Choice, from the Result of Experience in both Kinds. In the present Chapter, we shall acquaint him with the Methods of raising the Coppice from Seed: in the next, by planting.

It has been observ'd already, that any Piece of Land, even the most barren, will bear Trees; and the Farmer will do well to plant on all such Places; but he is not confin'd to them. He may take in a Piece of barren Ground; or he may use for this Purpose such as has been tilled already; he need not grudge a tolerable Soil, nor think much of the Rent he pays, for if that be no more than its Worth, the Wood which is produced will not let him be a Loser.

When he has fix'd upon his Ground, if it be to be taken from the Common, the first Thing he is to do is to enclose it with a good Fence; for nothing is so liable to Accidents as a young Plantation, nor is there any Produce among which Cattle will do so much Harm.

If it be a Field that is inclosed already, he must thoroughly repair the Fences, that they may every Way keep out all Kinds of Cattle. This Expence of Inclosure may appear at first Sight a Disadvantage; and the Preference may be given to the Plantation of Trees, for Shrowding or Pollards, which yield a great deal of small Wood, and need no Inclosure, nor take up any Ground; but an Answer is given to this at once, by those who have experienced both, which is, that the quick Growth of the Coppice Wood makes ample Amends for the Expence.

When the Ground intended for the Coppice is fenced in, let it be prepared by two or three deep and good Plowings, to refresh and break the Mould thoroughly: or it will be very well worth while, where the Quantity is not too great, to dig it well up with a Spade. In this last Method the Way is to trench it throughout two Spit deep, and cast the upper Part of the Soil undermost.

Numb. XII.

This will prepare and break the Earth excellently: and it has been found by Experience, that in Ground thus prepared, the Trees shoot in a Manner greatly superior to all that can be seen in any other Way of preparing the Earth for them.

Which ever of these Methods is taken, the Soil must be made very fine: if it be plow'd, it must be extremely well harrow'd afterwards; if dug with the Spade, let the Rake come after, and the whole be laid as fine as the Beds in a Garden.

Where the Soil is tougher, it will require more working, and where more tender and mellow, less will do; so that there is no laying down particular Rules on this Head to suit every Occasion. All that can properly be said on the Matter is, that whatever be the Soil, it must be brought by frequent turning and breaking, to the Condition I have mention'd. If it be kindly, less Labour serves: if otherwise, more must be employ'd: but never let the Husbandman slight over this Part of his Work, for all his future Success will depend upon this thorough Preparation of the Ground.

If he have his Choice among different Kinds of Soil, he should fix upon a good loamy Ground preferably to all others; and he should chuse that which is deep; for, though Trees shoot fast and freely in a shallower Soil, they do not thrive upon it afterwards. However, such is better for Coppice Wood than for Timber Trees, because as they are for a longer and larger Growth, their Roots must pierce deeper.

The Reader who has consider'd what has been written here already upon the Subject of Soils, will easily comprehend the Reason why a loamy one is here prefer'd to any other for the Growth of Trees in general. It is of a mix'd Nature between the sandy and clayey, and therefore will agree with such Trees as are suited to either of those Kinds. None gives Passage to the Roots more freely; and yet, it has a Body that preserves and fastens them so, as to support the Trees.

The Husbandman being thus inform'd of the Nature, Dressing, and Fencing of the Soil for his Coppice; is now to consider of the several Kinds of Seeds, and the Manner of sowing them.

His Coppice is not to be entirely destitute of the Timber Kind, it being very proper to have some for Standards, but it is in general to consist of such as are of smaller Growth. Among these the principal, and those of which Coppices are generally composed, are the Hazel, the wych Elm, the Birch, the flowering Ash, the common Ash, the Elder, the Hornbeam, the Maple, the Service, the Crab, the Chestnut,

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the Cherry, the white Thorn, and black Thorn, the Willow, and the Sallow.

Some of these delight in wet Soils, as the Willows and Alder, and others in dry or in middling Ground; this will be explain'd more at large hereafter, in treating of the several Kinds distinctly; but it is necessary to name it generally here, that the Planter may have it in his Mind, and direct himself accordingly.

If his Ground be in general wet, let him raise such Kind of Coppice Trees on it as flourish best in the wet: if it be dry, let him conduct himself in the same Manner, selecting for it such as love those Situations; and if it be in part wet, and part dry, let him suit the Growth in the same Manner to each part, setting in those Places which are wet, the Kinds that love Moisture, and the others in those which are dry. He is in every possible Respect to promote the free Growth of the Plantation, and nothing will do this more effectually, than a due suiting the Kind to the Soil.

When he has thus consider'd his Ground, and determin'd what Kinds to raise upon the whole, or what particular ones upon the particular Parts of it; he must next seek for the Seed; and in this he is to be as careful as in any of the other Respects: or all his former Labour and Care will be thrown away. Let not any be frighted at the great Strictness and Consideration of every Article in the preparing for raising of Copse that is enjoin'd here. There is no great Difficulty in performing every Part in this nice and accurate Manner, and the Success of the Plantation will always be proportion'd to it. In general where we see some thrive excellently, and others miscarry, 'tis owing more to the Care that has been taken in the Preparation of the Ground, and Choice of the Kinds, and of the Seeds of each, than to any natural Excellence or Defect in the Place where they are rais'd.

To be sure of the Goodness of the Seed, I would have the Husbandman never buy it, but always save it himself. There may be a Thousand Faults in bought Seed, which he will prevent in that he gathers; for his own Use because he knows how much depends upon that Article.

As we have recommended no strange or scarce Sorts of Trees for the Coppice, he may find enough of the several Kinds in his Neighbourhood, and may gather the Seeds himself.

In this let him take Care always to take them from a good, healthy, and flourishing Tree. Let him suffer the Seed to hang on this till it be thoroughly ripe, and then gather it by shaking the Boughs, and no other Way. And when he has thus got together a larger Quantity than he shall want, let him look it carefully over, and pick out of it for his Use only such as is clean, sound, firm, weighty and bright.

When the Seeds are thus pick'd, let them be put into large Garden Pots, with some Sand, and set by in a tolerably dry Place for the Winter. They might be sown in Autumn as Nature scatters them; but then they would be in Danger of being eaten into by Insects, or devour'd by Field Mice, and other Vermin. Nature intends the feeding these Creatures with the Seeds

of Trees, as well as the raising a Supply of each Kind; and it is therefore they fall naturally at that Season: but the Husbandman in this Instance has nothing in view but the raising that Supply, therefore he will do well to avoid the Danger of their being eaten.

All is now got ready for the Sowing: the Seeds have been preserv'd during the Winter, and the Ground so well work'd, that it is ready to receive them. The Spring is come, and the Husbandman must get to his Work. Let him take out his Seed, and spread it carefully.

I would advise him by all Means to do this with his own Hand, going over the Ground with a judicious Eye, and scattering the Seed equally, and sparingly. After this let it be well cover'd, and then Nature is to be left to herself.

There is a great deal of Difference in the Time of shooting of the several Kinds. Some shewing themselves quickly, others not till after several Months, and some not till the Spring following. This has been observ'd already, and will be treated also more particularly hereafter, under the distinct Heads, where we shall mention the several Species.

When the earliest shooting Kinds have begun to shew themselves, if there be any Quantity of Weeds rising among them, let them be carefully rooted up, and if the Season prove very dry after the destroying the Weeds, give the whole Ground, if it can conveniently be done, a little Water. The Earth having been disturb'd by rooting up the Weeds, will receive this the more readily, and it is surprizing to see the Effect it takes on the young Plant.

After this the Husbandman is to wait Nature's Course for the Shooting of the several later Kinds, keeping his Fences in perfect Repair, and have an Eye frequently on the Plantation, to keep off all Mischief, for nothing is so easily hurt as a Tree in its first Shoot.

When Winter comes on, let him order some black Thorn Bushes to be spread lightly, and carefully, over the young Plantation; and upon these scatter a little Straw where the Ground is most expos'd to the Winds. This will break the Force of those nipping Blasts, which are so fatal to young Roots of Trees, and preserve them from all other Mischief.

The Summer following let the Plantation be kept clear of Weeds; and as the Winter comes on let there be a few black Thorn Bushes scatter'd over the Ground, but more lightly than at first, to defend the young Shoots of those Seeds which have not appear'd till the preceeding Spring, that they may be in like Manner defended their first Winter.

The Summer succeeding this, let the Husbandman carefully go over the whole Ground, after a thorough weeding, and let him draw some of the Shoots where they have risen too thick, and plant them in Places where they have risen thinner. This is his Time for thinning and regulating his Plantation; and after this having once more look'd carefully to his Fences, he may leave all to the Course of Nature: not doubting but that he will have a Growth of Coppice Wood in every Respect as much exceed-



ceeding that of his Neighbours, as the Care he has taken in these several Articles has been more.

I am sensible that in the whole Course of ordering this Coppice Ground, I have given the Husbandman Directions to employ a great deal more Trouble than is generally allow'd to this Article of his Business: but I am also sure from Experience, that he will be well paid for every Part of it, in the speedy Growth, and Quantity of the Wood.

Some have a Way of raising a Coppice from Seed, by sowing the Seeds of their several Kinds of Shrubs with their Corn, upon a Piece of Land they intend to lay up for this Purpose. I have read Books in which this is recommended greatly; and I have seen it try'd, but the Event has not answer'd to the Promises. The young Shoots have always suffer'd greatly by being trod upon in the getting in the Harvest, and though the Stubble being left standing, affords some Shelter for them the following Winter, it is but very poor in Comparison of that regular Method I have here propos'd.

There can be no Objection rais'd against this Method, of which I have spoken so largely, but it's Expence: and this, if it were great, would be answer'd by the Increase; but in Reality it is not. The Care requir'd of the Master of the Plantation, is greater than the Charge; for his own Eye must be over all. As to the rest, a little Money will go a great Way; and what seems much in the directing, is little in the working.



## CHAP. II.

### *Of raising a Coppice by planting Sets.*

WE have shewn in the preceeding Chapter, a Method of raising a Coppice with Certainty and Success from Seed; in this we are to propose as candidly the other Way of doing it by Sets; and it will become us to be as impartial in the Account of the Advantages either Way as possible.

But to prevent an Error at the setting out, it will be proper to name one natural Objection against the Way of doing it from Seed, which is the Loss of Time. The Sets, or young Trees, costing little, and being advanced some Years Growth when put into the Ground. This is rather a natural Objection than a judicious one; for, though it hold true of some Trees and Shrubs, it does not of others. There are some that will take at once, and shoot strongly upon the Removal; others will be so much the more slow for it, that it has been of a seedling Tree, and one transplanted, that the former has in a few Years overtaken the latter, though it was of seven or eight Years Growth; and has continued growing stronger for many Years after, though the Soil, Situation, and Exposure, were the same to both, and all other Advantages equal. Mr. WORTON, an Author of great Veracity, asserts from his own Knowledge, that a Walnut set into the Ground, shall overtake a Tree of ten Years Growth planted at the same Instant.

One Thing more is to be observ'd against the Way by planting, which is, that as it will be prudent to have some Timber Trees in a Coppice, these will do much best from Seed, because the Shoot is always straighter, and grows even, and more regular, when sown in the Place, than when brought in by transplanting; and this in Timber Trees is a vast Article, their Value being, when grown, in a great Measure proportion to it.

Upon the whole it is to be allow'd also on the other Hand, that Shrubs, and the lesser Trees, bear transplanting better than those which grow to a greater Height: and one everlasting Rule must be, that the Husbandman either raise them himself upon a poor Piece of Ground; or take Care it be a poor Piece, from whence he takes them if bought. This being the Case, they will, upon being removed into his own better Land, shoot more freely; whereas if his own Soil be poor, and that of the Nursery have been better, they will make but a very slow, and bad Progress, as has been named already, on other the like Occasions.

After these general Observations, we shall come to the Method of raising the Coppice by Plantation; in which the Husbandman is first to go through all the Care of raising the Shrubs in a Nursery, or else to be at the Expence of purchasing them; and the greater Hazard of their thriving. There are many Reasons why he should raise them himself; we shall therefore suppose he intends that, and begin from the first Article.

He must first then select a Piece of Ground for a Nursery; and in this he must be very careful; for on his proper Choice of this, depends a great Part of his Success in all that follows. He is in his Choice to have regard to its Soil, and its Situation and Exposure.

In Soil it must be very poor, for the Reasons given already, that the Shoots may flourish when removed to the other Ground. There is scarce any Ground in which the Seeds of the several Trees and Shrubs will not shoot; and all that is requir'd of this Place is, that it be such as will give them Power to make the first Shoot, and support it to a little Height. I say a little, because I am for the Farmer's taking up his Sets earlier than is usually done; being certain that the younger they are transplanted, the better they will thrive; and that the Time thus lost in other Uses on the Land, will be well repaid by their expeditious Growth. This Loss of Time, and Use of the Land, is the great Reason of the Preference given by many to planting, instead of sowing the Ground for a Coppice. But Experience has shewn us, that any Loss so sustain'd, is repaid manyfold.

In Situation, this Spot design'd for a Nursery, must be defended from the North and West, and open to the South East. It must be well fenced; for one Breach may destroy the Labour of several Years, and it will be best if it lie dry. This is an Advantage of the same Kind, with that which is drawn from the Poorness of the Land: for the Trees transplanted from a dry to



to a moist Soil will always succeed; whereas, if removed from a moist to a dry they are very apt to miscarry.

Such a Piece of Ground being chosen and fenced; let it be well turn'd up by the Plow or Spade, in the Beginning of Winter. Let it be turn'd again early in the Spring, and perfectly clear'd from Weeds; and then let the Seeds be sown in it. These having been gather'd, examin'd, and pick'd by the Farmer's own Hand, in the Manner before described, for sowing the Coppice.

The best Manner of sowing is this. Let all the Seeds be kept separate; and let the Ground thus prepared be cut up with Trenches or Furrows four Inches deep, drawn at two Foot distance quite along or across it, and in these Furrows let the Seeds be sown, scattering them lightly in; and sowing only one Kind in one Furrow. When they are in let the Ground be drawn over them with a Rake, and then the whole left to Nature, only taking Care to keep the Place clear from Weeds.

There are two Sorts of Weeds in particular that are to be guarded against in a Nursery, these are the common Dock, and the common Couch Grass. The Dock roots itself so deeply that it cannot be torn up afterwards, without disturbing some of the young Shoots; and the Couch Grass spreads so by running under the Ground, that it will entangle itself with the young Roots, and rob them of their Nourishment; and will be impossible to be rooted up without tearing them up with it.

This Method of sowing by sprinkling the Seeds in a Trench, or Furrow, is best for those Shrubs which have small Seeds; but for such as are larger, as it will often be proper to have some of these, the best Method is to set them with more Exactness and Regularity. Thus Acorns and Chesnuts, for the raising their several Trees, are best set in Rows by themselves by a Line. But with respect to the Oak in particular, I should always be for planting the Acorn in the Ground where it is to stand, for the Reasons before-mentioned, the regular Growth of that Tree being a great Article in its Value.

The Nursery being thus sown is to be watch'd just in the same Manner as the young Coppice, when rais'd from Seed; and particular Care must, in either Case, be taken, to keep out Hares and Rabbits; for they will get in where there is not a Breach for Cattle, and they will eat up a whole Plantation to the Ground, when it is very young; and from their gnawing it never well recovers; and when the Shoots are of a larger Growth they will, in hard Winters, eat off their Bark, which is as destructive. The Care therefore of this Article extends to the Coppice, as well as the Nursery. The particular Methods of warding against this Mischief will be laid down hereafter, in its proper Place; where all the Accidents to which Trees are liable, will be treated of together.

The Seeds of the Nursery having thus shot, and the Shoots having been thus preserved in their tender State, from Weather and other Accidents; when they are grown to an Age to remove for the planting of the Coppice, let the

Ground laid out for it be opened in good, deep, and wide Trenches, at twelve Foot distance. Let this be done in the latter End of Autumn; and let the young Sets be carefully removed out of the Nursery, and, with all Exactness and Regularity, set in these Trenches.

In the Nursery the Seeds of the same Kind of Shrub were always sown in the same Furrow, but in the transplanting them let the different Kinds follow one another in the same Row, at moderate Distances. Thus the Coppice will be planted in the same Variety with that which is rais'd from Seed, and the Trees will not only look but thrive the better.

There is this Advantage in planting the young Trees in Rows so distant from one another, that the Husbandman may make use of the Ground between the Rows for any other Growth, till the Trees are of some Height; and this tilling between, far from hurting the young Trees, will assist their Growth. Then the Coppice will grow afterwards with a beautiful Regularity, being all laid out into natural Walks and Alleys. I should not name this as an Article worthy the Husbandman's Consideration, if it had in any thing interfered with his Profits; but it here agrees with them in every Article, for these vacant Walks will, in the felling Time, give the Workmen room to cut and finish up their Work well; and they will also give good and free Room for the Carts to come for the carrying off the Produce: and at the same Time Experience shews, that the Quantity of Wood produced in the same Number of Years, will be greater in a Coppice that has been planted in these distant Rows, than in one where the Trees have been set in the usual thick and confused Manner.

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### CHAP. III.

#### *Of the managing and ordering a Coppice in its Growth.*

I Have laid before the practical Husbandman the two Methods of raising his Coppice, at once from the Seed, or by the Assistance of a Nursery, that he may take his Choice, according to his own Pleasure, to the Uses he can make of his Ground while the Shoots are raising in the Nursery, or to other Circumstances, for these may prescribe a different Conduct on different Occasions.

I shall not presume to lay down any general and absolute Rule in this Case. All I shall say is, that what I have seen by Experience in the Country where I live, would lead me to prefer the Method by Seed, where all other Circumstances were indifferent either Way; but I would not advance upon this limited Knowledge, that the same Practice is to be prefer'd every where.

We have suppos'd the Coppice now rais'd by one or other of these Methods; and the Trees beginning to acquire some Strength. The Planter's Care, though it be lessen'd at this Time, does not absolutely end there; he is to see that his Coppice be duly supplied with young Trees and Shrubs in all Parts; not too full in one Place and vacant in another.



To this End he is to go over it the Year after all was left settled, whether by the Seedlings or transplanted Shoots, and in general this will be the Difference, that in a Coppice rais'd by sowing his Business will be to thin the Ground; and in that rais'd by planting to thicken it in some Places.

In this as well as the first thinning of the Coppice rais'd by sowing, I would have the Planter keep in his Mind the Advantages arising from the planting the Shoots in the other Way in those distant Rows, as has been directed under that Head. This is a Method which gives a considerable Advantage to a planted Coppice over the sown; but it is an Advantage that may in a great Measure, though not perfectly, be given to the sown Coppice in the Manner of thinning.

In the sown Coppice Preference must be given in the taking up superfluous Shoots, to the strongest and best growing; but so far as may be let the thinning be so conducted as to leave the standing Shoots in distant Rows. These will never be so regular as when the Coppice is planted in Trenches dug by a Line, but the nearer it approaches to that the better.

It must be own'd also, that in Coppices rais'd by sowing, not only the several first Years Use of the Ground is lost, but also the Advantage of tilling and employing the Earth between the Rows afterwards, which tilling, as before observed, is serviceable also to the Trees; but where I have seen the Experiments made, the Method by Seed, as I have said already, in spite of all this had the Advantage.

Upon the fullest Consideration of all these Particulars which I have now, in their due Course, laid before the Husbandman, perhaps it will appear in general, that when rich and valuable Land is to be laid up for Wood, the Method by planting is to be prefer'd; and when poor Ground of small Price or Value is to be employed for this Purpose, then the best Method is by sowing. But in this, as in the former Instances, the Rule is not to be delivered as universal, but the Owner, or Farmer, is to weigh all the Circumstances together, and then determine. They have been all laid here so particularly before him, that he may have them in his Eye together, and set out in this profitable Article of his Profession, in the most advantageous Manner.

We have directed him in the going over his rising Coppice for the last Time, if it have been rais'd by sowing, to thin it, by taking up such Shoots as shall be found ill-fashion'd, or superfluous, in such a Manner as added to the first thinning, shall dispose the Shrubs, though rais'd at Random from scattered Seed, into the Appearance of something like Order and Regularity.

On the other hand, when he makes this Visit to his Coppice rais'd by planting, he will find it is thickening that it wants; and this is as easily done as the other. The Shoots were planted here in such Number only as it was fit they should stand; and though this has been done ever so well, some will have fail'd: the Places of these must be supplied; and whereas some others will be found to grow very irregularly and ill, it will be best to take them up and put others in their Stead.

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This is the last Time of going over the Plantation with this View, so that if any of them are found to grow ill afterwards, the best Way is to cut them off slanting near the Ground, and leave them to make a new Shoot; which, the Root having now great Heart, will be very strong.

But in this Article of thickening a Coppice for the last Time, in order to its full Growth, we are not to omit that there are other Methods, and those very easy and familiar, beside that of taking up a bad Shoot, and planting a fresh one in its Stead; or setting such in accidental Vacancies.

In the first Place, there are several Kinds of Trees and Shrubs that will grow very well from Stakes or Cuttings; and these will succeed nowhere so well as in a Coppice of some Years Growth, because they are shaded, and the Ground is kept damp about them as if watered.

The Trees which are to be planted thus by Sets, are more numerous than commonly imagin'd, the Willow, Sallow, Osier, Alder, Aspen, and black and white Poplar and Elder, may all be thus rais'd, and the Time for planting the Sets is early in Spring. These are of excellent Service for the thickening the Coppice, in Parts where the Ground is damp. This Wetness which has caused the other Plantation to fail, will make these thrive, for they are the proper Trees for it, and will never fail. It will be useful to go over the Coppice, whether rais'd by sowing or planting, in this Manner in Spring, when it is of a due Growth; and thus to add to it, in the proper Places, these Kinds which love a watery Soil, and which will not only thicken it as to Number, but advance beyond all others in those Parts of the Ground.

As Spring is the Time of adding these Trees, in this particular and easy Manner to the Coppice, the Season for supplying its Deficiencies with the others, if introduced from the Nursery, is in OCTOBER or NOVEMBER; they are to be chosen of a proper Growth; and to be taken up just after the Leaves are fallen. In the removing these, as they are somewhat larger than those first planted, some more Care is to be taken. They are to be rais'd up with as much of their own Earth about them as can be preserved, and only the tap Root, or large downright Root, is to be shorten'd: a large Hole is to be open'd for their Reception; and the Roots are to be carefully and evenly spread in it, and cover'd with light Mould. The whole being fill'd up, the Plant is to be watered, and so left to grow.

As this Method of transplanting into the Coppice is much more troublesome than that of raising the Willows, and other Trees just mentioned, by Sets; there is another middle Practice between them, which may be us'd very advantageously for the thickening of a Coppice: and this is by what is call'd among Gardiners, laying of the Branches.

To this Purpose, when the Husbandman sees a vacant Place that wants to be thickened, let him pitch upon a good Branch of one of the nearest Trees on each Side; and giving each a Chop half through, or more, as has been before observed on the plashing of Hedges, let him bring



bring it down to the Ground; and opening the Earth a little, lay in the Branch, staking it down with two or three Pegs, and then cover it with the Mould that was thrown out.

Each of these Branches, thus laid, will produce a great Number of Suckers, which will grow freely enough; and the vacant Place will thus become, perhaps, one of the thickest Spots of the whole Coppice, in less Time than could be imagin'd.

The last Time for laying of these Branches is in the Beginning of the Spring, just when the Sap is rising freely, and the Buds are going to break out on the Twigs. If the Earth thrown out of the Trench, that was made for laying it, do not cover it thoroughly, there should be more added till a little Hill be rais'd all along. Where the Branch is carried: this will forward the striking of Roots downwards, and Shoots upwards; and the Quantity and quick Growth of the young Plants, will surprize those not used to these Assistances of Nature.

If the Coppice be too thin in many Places, where the Branches from the neighbouring Trees cannot be laid to thicken it; let several Branches of some other proper Kinds be laid in their Place, in the Manner just directed for a Supply of young Trees, if the Nursery do not afford a competent Number for that Purpose. These will send up each its proper Quantity of Shoots, and they may afterwards be removed to Places where they are wanted with little Trouble.

Many Trees are propagated better this Way than any other, in particular the Lime, the Birch, and Horse Chestnut; and the Elm very well. These young Sets are to be removed early in Spring, and once water'd, and they will grow without any farther Trouble.

The Sets of Willow, Poplar, and the like Kinds, which we have order'd to be inserted early in Spring in their proper Places in the Coppice, are to be cut only one Way, at the End that goes into the Ground. Experience shews that they take the more certainly for this little Circumstance.

Finally, to give the last Article in the Management of young Coppices, we are to mention the cutting them down at a certain Growth: not for their Wood, but to increase the Quantity afterwards.

Some deliver this as a necessary and universal Practice; and in some Places it is universally done: but this we do not recommend, though, in part, such a Practice be very useful.

It is founded on this, that from the main Shoot when cut off, there will rise a Number of others: this is a plain Truth; but Experience does not therefore always support the Practice. When this is done, it is to be at two Years Growth, if the Coppice have been rais'd by planting, and at four Years if it have been rais'd from Seed. The Shoots are to be cut off within three Inches of the Ground, and there will rise from them many new Shoots, which the Root will push up very vigorously, and which will soon make so many good Poles.

There may be Places where it will be necessary, or at least proper, to cut down the whole

Growth at that Time in this Manner. Particularly when the Soil is very poor, and the Coppice having advanced so far, is seen not to prosper. In this Case the cutting down the whole within two or three Inches of the Ground, will give Strength to the Roots, and they will shoot up vigorously from all the Stems: but although particular Circumstances, and especially bad ones, may sometimes render this proper, it is not to be set down therefore as universally necessary.

Some Time is plainly lost by it; and in Places where the Growth succeeds well, 'tis evidently better to let it wholly alone than to cut it up. 'Tis better in this Case to take an earlier felling, as for Instance, at eleven Years Growth; and then to expect the Growth of these numerous Shoots, which will rise so quick from the Roots now so confirmed and strengthened, that in seven or eight Years, there will be another felling ready, richer than the first.

But to speak from Experience, and to favour real Advantage more than any particular Scheme, it will be best to moderate the Practice; and I would have every Husbandman in part follow it, whatsoever be the Soil and Condition of the Growth, tho' very rarely do it entirely.

Thus at the third Year, if the Coppice have been raised by planting; or in the fifth, if from Seed; I would have him go through it for the last Time with a careful Eye, making good all Deficiencies, and retrenching all Superfluities: and I would have him now take a Labourer with him, with a good sharp Bill in his Hand. Let him examine every young Tree in the Coppice, and let him leave all such as grow prosperously and regularly to stand as they are, but let him see every one that grows irregularly and ill, or that seems not to thrive like the rest, cut down in this Manner within three Inches of the Ground, by one slanting Stroke of the Bill. This Practice will give Strength to such Roots as want it, by taking off for the present the Shoot that was too much for them to feed; and it will leave the rest to continue in that prosperous Condition wherein he finds them. This is the Practice of Reason; and this the Method in which the moderate and judicious Husbandman will use all those Instructions which are given by People too warm in the Pursuits of their particular Notions, to give Way to a due Consideration of their Interest.

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#### C H A P. IV.

##### *Of the Felling of Coppices.*

WE have now brought the Coppice to a Time and Condition, in which it wants no farther Assistance from the Husbandman; he is only to see that the Fences keep sound in every Part, and leave all to Nature. The Trees are now too strong to be hurt by Weeds; on the contrary, they will suffer none to live among them; except some few of a particular Kind, as Fern about their Roots, and Sanicle, Betony, and some other such under their Shade, which do no Harm, and will not live elsewhere. The Husband-



Husbandman is to give himself no more Trouble on this Head, but wait with Patience till the Coppice is fit for felling.

We meet with very punctual Directions on this Head in Books; and every Woodman to whom the Husbandman shall speak on the Subject, will dictate to him as positively: but Experience is more cautious; and following that Guide alone, we shall tell him that no exact Direction can be given. The Writer delivers imperfectly; what he has heard partially; and the Woodman forms his Judgment upon what he has seen in two or three particular Places, and thinks all Nature is to follow that Rule.

Experience shews, that in different Places the Growth of a Coppice is very different, according to the Soil, Situation, Degree of Moisture in the Ground; and many other Accidents: some very obvious, others not to be discern'd by the most curious and penetrating Eye. The Time of felling the Coppice is to be regulated according to this: for 'tis not its being of such an Age from the Sowing or Plantation, but its being in such a Condition of Growth that renders it fit to cut.

All that can be deliver'd with Certainty on this Head is, that the earliest Time at which a Coppice should be cut, in whatever Manner it has been rais'd, is the eleventh Year. It is only in favourable Soils and Situations, that it is fit to be felled so soon; and in others, from this Time the Husbandman must Year by Year watch its Growth, to see when it is in a Condition for cutting down to his Advantage.

Twelve or fifteen Years is a common Age for felling; and sometimes there is a Necessity of letting the Wood stand longer. But this is to be understood only of the first fall: for the Roots are then so establish'd, that a much smaller Time does for a new Growth.

It is a very good Practice in many Circumstances, to fell the Coppice in Parcels, as has been hinted already. For Instance, Let the Owner begin at twelve Years Growth, and fell one eighth Part of his Coppice: the next Year let him fell another eighth Part, and so on every Year one eighth, to the last. The last Years felling will then be of twenty Years Growth; and he will find it will very well pay for the Length of its standing.

Every succeeding Year's felling will be larger and larger than the last; and the Difference between the Growth of twenty Years, and that of twelve, greater than will easily be imagin'd.

This is the Way of making the Coppice yield a regular annual Income; for by that Time he has felled the last eighth Part; the first having had so many Years for Growth, is ready to be felled again, and he may thus go on Year by Year, so long as the Roots will hold out.

The Time for felling a Coppice is during the whole Winter; the Woodman may be set to work in the third Week of SEPTEMBER, and the Business may be continued till the first Week in MARCH. After this, the sooner the Produce is got off the Ground, the better: for the Owner is to consider his succeeding Growth. Spring will be now coming on, and the Trees will be

very ready, and quick in shooting from the Stumps. These Shoots must not be injur'd; for on their fair Growth depends the Value of the next Fall. For this Reason the sooner all is clear'd off the better; for the Feet of the Cattle, and Wheels of the Carriages, and the Roughness of the Brush Wood will tread down, break and destroy these young Shoots to a great Degree, if this Part of the Work be neglected, until they have made their Appearance, and obtain'd some Length.

Let the Husbandman himself attend the Woodmen in their Work, that he may see the felling perform'd to his Advantage. In the first Place let him leave a Number of regular and well growing Trees at proper Distances for Timber; and let him see these rightly trim'd of their waste Boughs, that their Sap may be so directed as to feed the Trunk, and carry it up even and regular.

Let the others be cut off at five Inches from the Ground, that the Shoots for the next Growth may rise properly; and let them be cut off sloping, and with a sharp Instrument; for all bogging at the Stump does great Mischief. The Success of the succeeding Growths in a Coppice, depends more than can be imagin'd on the employing a good Workman, and seeing that he keeps his Tools in order.

A Readiness and Expedition in the removing the Wood of the last cutting, has been recommended already: when all is clear'd off, the Husbandman is to see the Coppice well fenced as at first, that it may shoot without Interruption or Injury. He cannot be too careful on this Head; for the Mischief he may suffer is very great. The Coppice being well defended, and left to itself, will surprize him by its Shoot of the first Summer, and afterwards it will grow in proportion Year by Year to the next cutting.

After a few Seasons it will be too strong to be hurt by Cattle: but if it happen either through the Owner's Negligence, or in Spite of his Care, that Beasts have got in and crop'd it the first Year, so that it does not thrive, for that is a certain Consequence; the only proper Method is to go over the Shoots at the End of SEPTEMBER, and cut them down that there may rise new ones in their Place; and then to see that the Plantation be better defended than before. This is always worth while: for the Difference is great between the Growth of those Shoots in a Coppice which have received no Injury, and those which have been hurt.



## CHAP. V.

### *Of Pollards, or Trees for Shroding.*

FROM the Management of Coppice Wood we are to advance to the Consideration of Timber Trees; but we are naturally stop'd between both, by a particular Kind of Growth, which is properly speaking, neither of the Coppice Wood, nor Timber Tree Kind: this is the Pollard; a Tree of any Sort cut off at ten or twelve Feet Distance from the Ground, and shooting



shooting out from that Part a Number of Branches or Poles.

These Poles or Branches are called Shrowds, and the lopping them off is called shrowding of the Tree. These are raised for the Supply of the Fire, and other small Purposes; and are cut at certain Seasons, not the same for all the Kinds, but in general according to their Growth.

Trees intended for shrowding, are planted sometimes in Hedge Rows, and sometimes in waste Places: the Kinds that love Water along the Sides of Ditches; and those that bear Dryness and Exposure, on Commons, and in the most barren Places. The Water Trees, as they are called by some; that is, such as love wet Places, are the quickest Growers, the others are according to their Kinds, more and more slow.

Pollards are inferior to Coppice Trees in the Quantity of Wood they yield, and in its Value; for the Coppice Wood is fit for many Purposes, that the Shrowdings of the Pollards can never answer, and therefore brings a better Price; but on the other hand, Pollards are maintain'd, as before observ'd, at a smaller Expence, indeed it may almost be said at none at all; for they require no Fences, they take up no Quantity of Ground; and they are in their Shoots above the Reach of Cattle.

The most frequent and most profitable Trees for Pollards, according to the three distinct Uses and Situations already named, are the Willow for watery Places; the Ash for Hedge Rows, and the Oak for Commons. But each of these Situations will support several others to Advantage; and there is scarce any Tree that may not be brought to a Pollard at the Owner's Pleasure.

In general, the Husbandman should shrowd such Trees as are not fit for Timber; or any from which he desires to have a present Advantage, or which he intends shall supply his Family, or the Market, with Fuel quickly and readily: for there is no Growth so speedy as that of the Tree which is shrowded.

Trees intended for shrowding may be raised in many Places, where it would not be worth while to have others, because of the Injury they would do the Ground: for, as to shrowded Trees, the Farmer may have the Benefit of grazing under them, while the Tops are growing, so that little Produce of the Ground, where that is of any considerable Value, is lost by their Growth: and when their Heads are so large that they injure the Growth of the Grass, they make Amends another Way, for they then afford Shelter for the Cattle, the Necessity of which is sufficiently known to every Grazier.

For the Planting of Trees intended to be Pollards, the Husbandman should follow these Directions.

First, Let him observe what Kinds of Trees thrive best in the Hedges, or on the Commons about his Neighbourhood; and let this direct him in the Choice of the Kinds for his Pollards.

When he is thus determin'd which of all the Kinds of Trees that are fit for Pollards to raise, let him mark out the proper Places whether in Hedges, by Ditches, or on waste Ground; and let him not set them too near one another; for

in that Case they would defraud one another of Nourishment.

For the Generality, the nearest they should come to one another is forty Foot Distance. The Ash may be planted somewhat nearer than other Trees in general, and the Elm nearer than any other Kind: but in this Design of Shrowding, between thirty and forty Foot should be the nearest they are ever allowed to stand, let the Soil and Situation be ever so good.

Having fix'd upon the Kinds and Places, I would have him raise them by planting, not by sowing; for, in this Case, that latter Method would be tedious and unnecessary. Let him therefore take the young Trees out of his Nursery at three or four Years Growth, and plant them where he designs.

I am particular in advising the Husbandman to take the young Trees out of his own Nursery, because he will take Care, as before directed, to have that upon a very poor Soil, whence the young Trees being brought to a somewhat better, if not entirely good one, will shoot vigorously.

The Heads of these young Trees are not to be cut off at the Time of their Transplanting, for two very substantial Reasons. First, if they be of the light and pithy Kind, the Wet will be likely to rot the Top where it is cut; and in the next Place, they are not of a due Height, for the Part whence the shrowded Tree is cut off, must rise above the Reach of Cattle; else they will crop and mangle the young Shoots, and the Shrowding will be worth very little.

At whatever Age Trees are planted, they are not to be cut off for Shrowds till they have stood a Year or two to get firm and secure Rooting. The best Time for doing it is in Spring; and the whole Care respecting the Height is, that it be such as to prevent the Mischief just named by Cattle.

In some Cases the Husbandman may find Trees of a considerable Growth, that he shall think it worth while to cut off for Pollards; as the Poplar, Willow, and some others: but he must do this carefully, and the best Rule is, that he cut them off at some Place, where there is a good Side Shoot to draw the Sap; otherwise it is often seen that a Tree of this Bigness perishes under the Operation.

The Trees, of whatsoever Kind, being thus cut off, are to be left to Nature, for the shooting out of Poles or Branches. These will appear soon, and grow very fast: and when they are of such a Bigness as to answer the Husbandman's Purpose, he is to lop them. With respect to the Time they are to stand, no Rule can be given, any more than they could about the Copse Wood, because some Kinds of Trees grow much quicker than others; and the same Kind will require a different Time to come to Use, according to the Soil and other Circumstances. The Owner's Eye therefore must be his only Rule in this Case: he is to consider the Nature of his Occasions, and to cut them down when they are fit for those Uses. Observing always that in these Shrowds, as in the Growth of Coppice Wood, the Value is always greatly increased by allowing a Year or two more in Growth.

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The Season for shrowding or cutting the Shoots of Pollard Trees, differs in some Degree according to their Kinds. As to the Oak and other hard Wood Trees, when they are made Pollards, the Shrowds may be cut at any Time between Autumn and Spring; but it is best done in Autumn: but on the other hand, the Willow and other soft Wood Trees, including the Ash, should never be shrowded, except in Spring; for if it be done in Autumn, the Winter Rains will be very apt to damage, and will often destroy the Tree.

To prevent this Mischief in any Case, Care must be taken in cutting off the Shrowds of all these Trees, but especially of the soft Wood Kinds, that they are cut off carefully in a sloping Direction, and with a sharp Instrument: for in these, as in the Coppice Wood Shoots, all haggling of the Stumps does great Mischief. More depends upon the employing a good and careful Workman on these Occasions, than any one will be aware, who has not minded the several Consequences.

Finally, for the last Article in the Management of Pollards, I shall direct the Husbandman to fell or stub them up at a proper Time; for they do not last like other Trees that grow

upright and naturally. Pollards usually, after some Loppings, grow hollow and decay. In this Case they not only lose their Value in the Trunk, but the Produce of the Head is less, and of slower Growth.

For this Reason I advise the Husbandman to provide for a Supply in Time, by planting a young Tree of the same Kind between every two, and shrowding it at a proper Growth. When he is thus prepared let him watch all his old Pollards, and take them before they decay. Cutting them up at this Time they will yield a considerable Quantity of good Wood: the best of it will be fit for some mechanical Uses according to its Kind, and the worst for Fuel.

I have said these old Pollards are to be fell'd or stub'd up; but from Experience I altogether prefer the latter Method. The Price of stubbing them up will always be return'd in the Quantity of Fire Wood yielded by the Root; and the young Trees will thrive vastly the better, for the clearing and stirring of the Ground.

In this Manner I would have a Quantity of Pollard Trees always kept up about a Farm, and by the Method here laid down there will be a Supply of them from Generation to Generation.

## BOOK IV. PART II.

### *Of the Management of TIMBER TREES.*

#### CHAP. VI.

##### *Of Timber Trees in general.*

THE Plantation of Timber Trees is an Article of vast Consequence to the Publick, as well as of great Advantage to private Persons: their Uses in building, and other necessary Articles of Life, are sufficiently known; and our Navy depends upon them. Their Value to the Possessor is often such as to recover an half-sunk Estate: so that, taking in the whole of the Consideration, it is not easy to name any thing a Man can do, that is more for publick and private Advantage together, than planting. It is cheap, and it is easy; and it is of all Methods the best in which a Man can make Atonement to his Successors for his own Extravagance: and he who sets about it with Spirit, should consider he is working for himself, his Heirs, and Posterity.

These are the natural and plain Advantages of planting Timber and Forest Trees, and yet the Care of it is, in a Manner, lost. Neither Laws nor Reason seem able to affect Men against their immediate Interest; nor will any thing tempt them to look farther. The Heir cuts down Wood without the least Thought of providing for his Heir, who may probably enough be left in real, in the Place of his imaginary Wants. We shall be happy if, by setting forth plainly, in the ensuing Sheets, the Ease of planting Timber Trees and their Value, we can raise again a Spirit for setting about that useful Work, at

the same Time that we deliver the necessary Directions for the doing it in the most successful Manner.

Timber, or Forest Trees, are planted in Woods, in Parks, in Avenues, and in Hedge Rows, and they succeed very well in any of these Ways. They may be raised from Seed either in the Places where they are to remain, or in Nurseries, and removed by Transplantation; the latter is the more common Way, but the former is the better: this I affirm from what I have seen on repeated Trials. The Method by sowing will seldom, however, be prefer'd, because of its Slowness; People are eager to see the Effects of their Labours, and the other Method shews them most readily.

When Timber Trees are to be rais'd by transplanting, the Sets are to be had from a Nursery: and the Directions which have been given on that Head, for the raising the Supply for Hedges and for Coppice Wood hold good here. The Poorness of the Soil of the Nursery is also a particular Article to be regarded in this Case.

The Disadvantage of Trees rais'd by transplanted Sets, in Respect of those from Seed, is owing principally to some Check they receive in the transplanting; and this is sure to be greater when they are removed from a better than from a worse Soil: the only Thing that could make Amends for the Stop naturally made by this, is the removing them into a Soil so much better than their own, that they should feel it instantly.



A great deal of Good is to be done also, and a great deal of Mischief to be prevented, by the Method of transplanting, of this we shall speak at large hereafter: but in this Place there comes a more immediate Consideration, that of the Soil in which the Plantation shall be made.

In this there is a great deal of Difference between the Plantation of the Coppice Wood Shrubs or the Pollard Trees, and that of Forest Trees. The former Kinds are intended for immediate Growth and immediate Use; but these latter are to stand a long Time, and on their Strength and Soundness, at the End of so many Years, depends entirely their Value. This will be more certain in some Soils than in others: those Soils, where there is Choice, are therefore to be prefer'd. In general the Trees of these Kinds will shoot quickest in the lighter Soils; but it is in the firmer and stronger they grow to the greatest Value. An Oak in a clayey Ground, makes slow Advances, but the Timber is never so perfectly firm and sound as when it grows on this particular Kind.

We are not, however, to infer at once from this, that clayey Soils are the best for Trees. A particular Instance is not to be advanced into a general Rule: other Soils agree with other Trees; and very well, though not so well with the Oak; there is no Need therefore to be particular in the Preference.

The Coppice and Pollard Trees may be planted on any Soil; but 'tis not so with the others: as we are to look upon a Plantation of Forest Trees as a publick Benefit, we ought to wish all possible Success to those who undertake it, and to contribute to it by all possible Means. In the first Place then, the better is the Soil, so much the fitter it is for large Trees; and one particular Consideration comes in here, which is, the Depth. The best Soil imaginable, if it lie over a Bed of Rock, though at some considerable Depth, will starve large Trees: a much poorer with Depth is better.

Without Exception, the richest and the deepest Soils produce the largest and the fairest Trees. The Quickness of their Growth depends, in a great Degree, upon the Goodness of the Soil, but their absolute Growth to their proper Bigness and Strength on its Depth. We shall find this, on Examination. If we bore into the Earth where Trees grow tall, fine, and regular, we shall find it always deep; and on the contrary, wherever the Soil is shallow, we shall see the Trees of the same Kinds stunted, crooked, and low; with no other Occasion for that Alteration whatsoever.

Timber Trees would, in general, grow very well in our rich Pasture Grounds: the several Kinds that love a dry Soil in the higher Pastures, and those which love wet in the Meadows; but there is no Occasion to sacrifice such Land to them: the best Method he who is about to plant can take, is to search about his Ground for some Place where the Soil is deep, and the Land not turn'd to such Account; and then, in whatsoever Form he chuses to plant them, he will make it turn, in the End, to a much greater Benefit than any other Part, let what Use will be made of it.

There is no Need to be particular as to the Nature of the Soil, provided it have this great

Article, already named, of Depth. In general, those which are too dry are the worst: and to name the best of all, it is the loamy Kind. No Matter what be the Colour: but a Soil of this Nature, compos'd, as has been already explained in the fourteenth Chapter of our first Book, of Clay, Sand, and a proper Quantity of vegetable Mould, and lying to a proper Depth, with some soft Bed under it, is the Soil that of all others the most universally agrees with Trees; and does best for all.

There is no Wonder in this Preference, when we examine the Nature of Things; for if we demand what is it that a Tree wants from the Soil in which it grows? the Answer is, a Firmness that will give hold to the Roots; an Openness that will let in the Rains; a Richness for Nourishment; and a Depth that it can pierce with its Roots in proportion as it advances in Height: now all these Qualities the loamy Soils have more than any other Kinds.

As to Depth, that is in some Degree accidental; but in the general, loamy Soils do not want it, for they are thicker commonly than others, and they usually lie upon a Bed of Clay which the great Roots are able to pierce, while the others spread themselves in the lighter Soil.

Then the Firmness that is in the Loam gives it a Body; and the Sand that is in it breaks it to let in the Rains: while the vegetable Mould, which makes the other Part of the Composition, supplies its Part of the Nourishment. Thus Loam has all the Qualities of these several Soils, and yet has not the Disadvantages under which they lie singly: for though being all thus blended in Loam they make so admirable a Soil for Trees, they would neither of them do well alone, excepting for a few particular Kinds.

Clay will give hold to the Roots, but it is cold and has not Nourishment: even the Oak that grows so sound in a clayey Soil, expects some Moisture of vegetable Mould, for it does not succeed well in Clay alone. Sand that has Warmth enough, wants Body to hold the Roots. And as Clay will not admit the Rains, Sand, though it admits, lets them through, so that they do not remain long enough to be of Use to the Tree. In the same Manner vegetable Mould alone, which receives and keeps the Rains sufficiently, and affords such abundant Nourishment, does not give a sufficient Hold to the Roots, because it is too loose and crumbly.

Loam, as we have seen, possesses all the Advantages of these several Soils, without being subject to their several Inconveniences, and therefore Reason declares it to be the best, as Experience shews it is; we see all Trees, without Exception, grow well upon loamy Soils; and most of them flourish: then, as there are certain Plants peculiar to Clay, which will not live in Sand, and some that delight in Sand and will not live in Clay, so it is with Trees: but in the same Manner as all these Plants, so all those Trees will grow and thrive in Loam.

The loamy Soil then is that which he who is about to plant for Timber is to chuse; and if he can with Convenience, I would advise him to fix upon some Spot where Trees have not grown before. For it will be the richer, as its nutritive



tritive Parts have not been exhausted by former Growths.

Some carry this so far as to advise a Piece of Ground on which no Crop has ever grown; but this is a needless Caution, for Timber Trees are to seek their Nourishment principally at a Depth, to which the Roots of Corn, and other of the common superficial Crops, do not descend.

When he has thus fixed upon his Spot, I would advise him to use the same prudent Caution that was recommended on the Subject of Coppice Woods. That is, that if the Soil be not exactly what he could wish, he suit the Trees to it: and if it differs in some Places from what it is in others, he is to use the same Caution of planting in those particular Places, such Kinds of Trees as that particular Soil agrees withal.

Thus if his Ground be throughout much inclining to the clayey; or what is called a very clayey Loam, let him plant in it the greatest Quantity Oak: if it be too much tending to Sand, let him plant Ash in the greatest Number; and in the same Manner let him suit the Growth to the Soil, according to those Directions which shall be given at large, when we come to treat severally of the Kinds of Forest Trees.

At the same Time if only some one Part of the Ground be very clayey, let him there plant Oak; if some Part sandy, let him here set Ash and Sycamore; and in like Manner if any Spot be particularly wet, let him there plant the black or white Poplar, and such other Trees as love a wet Soil; the several Kinds of which will be pointed out to him at large hereafter.

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## C H A P. VII.

### *Of raising Timber Trees from Seed.*

**W**E have observ'd in the preceeding Chapter, that some raise their Plantations of Timber Trees from Seed upon the Spot where they are to remain, others in Nurseries from whence they remove them by transplanting, when they have arrived at a proper Growth. As we have already done in regard to the small Wood for Coppices, we shall do in respect of these: we shall deliver the best Method of doing each; and the several Cautions to be observ'd in the Practice.

The Seeds of these large Trees, are in general large also; and they therefore are not to be sown by scattering them at random over the Ground, or spreading them in Trenches. They are to be set in regular Rows by a Line, putting them carefully into the Earth, and seeing them well cover'd. This is the Practice when they are to be rais'd in a Nursery for transplanting: but when they are sown where the Trees are to stand, another Method is to be follow'd, and the Success is more certain.

To this Purpose having fix'd upon the proper Places, and Distances at which the Trees are to stand, a Hole is to be open'd in the Earth for

each Tree with a Spade. Let this be dug two Spit deep, and about two Foot square. Let the Earth be well broken, and put in again; and then four or five Acorns, or of whatever Seed is chosen, be carefully set in this new stir'd Ground.

Let this be done in the Beginning of October. When the Ground is laid level over the Seeds, lay a black Thorn Bush lightly over it, and then raise a little dead Hedge, or a slight paling round it; and thus leave it till the Seeds shoot. This may be called by some a troublesome Method; and indeed it is more troublesome than the common Way of Planting, which spoils half the Trees by Neglect; but all the Expence of digging for a large Plantation will come to but little; and for the rest, 'tis only doing earlier what in open and exposed Plantations others do later.

If the Place where the Plantation is made be within a good Inclosure; and no other Use be made of the Ground, this Care of fencing round the Seed Spots may be omitted; but there will always be Danger. In the Method here prescrib'd, the Ground may be used for the common Purposes of Husbandry, all the Time the Trees are growing up to a Heighth; and they will be defended by the first Work, till they are out of the Reach of Danger.

No Method so well gives Trees the Advantage of growing up for the first Years in perfect Security and Quiet; and few conceive how much the future Beauty and Value of the Tree depend on that Article. The least Hurt from Man or Beast, while young, may blemish a Tree for ever: nay, the very blowing of the Wind will sometimes do it an irreparable Mischief. It is at this Season only they require Care, but here they really require the greatest.

According to this Plan, the Owner will be sure of every Step he takes: he will have a Plantation, every Shoot of which shall certainly thrive; and every Tree be regular and beautiful: and this is the Method we prefer for raising Plantations, though we shall do Justice also to the other.

When the Seeds in these several Spots have shot above the Ground, let the Place be kept clear of Weeds, and their Growth for a little Time carefully watch'd. As soon as they are so far advanced that the Eye can judge of them, let one be marked for the reserved Plant that is to stand, and be the future Tree; and let the others be drawn up and set in Hedge Rows, Coppices, or where the Owner pleases; leaving the favourite Shoot alone to have the Benefit of the Ground. This will shoot up at a surprising Rate, and almost always with perfect Regularity. If from any Accident it prove faulty, let it be taken up, and one of the best of those that had been transplanted, again removed and set in its Place, watering, and shading it, which may easily be done by means of the Hedge or Paling; and using every Method to forward its Growth, that it may not be too far behind the others.

Thus is a Plantation of Timber Trees rais'd by sowing; and no farther Trouble is requir'd about them.





## C H A P. VIII.

*Of propagating Timber Trees by Transplantation.*

**I**F the other Method by transplanting be prefer'd from the particular Fancy of the Owner; or from the particular Circumstances of his Situation, which may sometimes reasonably influence him to make that Choice, though naturally and generally the other is best, the following is the Method to be observ'd.

First then, let a Spot be chosen for a Nursery on a poor Soil; and let the Seeds of the several Timber Trees intended to be raised, be set according to the Directions before given by a Line. When they are come up, let them be thinned where they have risen too thick, pulling up the weakest Plants.

When the others are of a proper Growth, let them be transplanted into the Places where they are to stand, observing the following Directions; on the punctual regarding of which, a great deal of the Success of this Undertaking will depend. All Trees are injur'd by removing, but that Hurt is usually much greater than it need be from the improper or careless Manner of removing them.

In the first Place, as to the Time of transplanting them, the best is when they are of two Years Growth. Most People do it later, but I have found fewer Accidents when they were thus young, than at any other Time.

Let them be taken up out of the Nursery with more Care than is usually allowed. Let the Place be open'd to receive them; and let them be brought to it with as much of the Earth of the Nursery about the Root as possible.

Let the large strait downright Root, in such Trees as have one, be cut off at the End; and the Hole be deep enough to receive it without bending. This is what is called the Tap Root; and the preserving it in its proper Direction, is of great Consequence to the regular Growth of the Tree. Let the other Roots be as evenly laid in, and as little crush'd and injur'd as possible: and when the Earth is put over it, let it have a careful watering to settle and fix it about them.

Let Care be taken that the Hole into which the young Tree is set, though deep enough to receive the tap Root, be not so deep as to bury the others below the best Part of the Soil. This is a common Fault of those who in small Plantations will be over careful. By this Mistake they set all the young Roots in a Clay or a Gravel, whereas they might have disposed them in a good vegetable Mould. The lodging these Roots carefully in the best Part of the Soil, and keeping them evenly dispos'd, and well spread out, with Earth between them, is a very great Article: and to this Purpose when the Soil is very thin or shallow, it is best to keep them in it, and if need be, to raise the Earth about the Bottom of the Tree, rather than sink that too low.

The Distances at which they should be plant-

ed, we have already said depend upon the Nature of the Tree. The Oaks should stand at forty Foot Distance every Way: the Elms at thirty; and all other Trees at some middle Distance between these. This, and the other particular Directions, will be given in treating severally of the distinct Kinds; we are here speaking of Planting in general.

In the same Manner is to be understood the Preference given to sowing above transplanting: it is deliver'd of Trees in general. We shall shew hereafter how either Method suits best with each particular kind of Tree.

The Directions here laid down will ensure a general Success, when they are practis'd with due Care in the Transplantation of Trees of two or three Years Growth. But as it is a common, and, in many Cases, a very right Practice, to remove such as are of a larger Size, it will be useful to set down here the Cautions and Expedients which are to be used in removing them, and to assist the Success.

When a Tree of some considerable Growth is to be removed, let the Hole in which it is to be set be thoroughly prepared before it is brought; and in the taking it up out of the Nursery, let there be as large a Quantity of its own Earth as well may be, removed with it, and kept close to the Roots.

Before it is taken up, let there be a Mark made upon its Bark with Chalk, facing the South; and let Care be taken in the setting it in its new Place, that this Mark faces due South again.

There is more Reason for this than is generally imagin'd, for the Sap naturally rises most in all Trees on that Side which is next the Sun; and if the same Side be not kept next in the Removal, this alone will make a Confusion, and be a Check upon the Growth; which is the great Thing to be avoided in Transplantation.

The best Season for transplanting Trees which are somewhat grown, is in the latter End of OCTOBER: for the young ones 'tis as well to do it somewhat earlier. The watering of new planted Trees, which is so necessary to all, is the more needful as they are the larger; and they will then bear it also in greater Quantity; for too much Water in a cold Season to a very young Tree sometimes chills it.

Particular Care must also be taken in these Cases, to spread those Roots evenly which stand out beyond the Clump of Mould taken up with the Tree; and to close the Earth well about them.

When the Tree is thus planted upright and steady, it must be staked up to keep it so. One or more Stakes are to be thrust firmly into the Ground for this Purpose, and the Tree is to be fasten'd to them with a Flay-band; and it is always good to put a Handful of Moss between the Stakes and the Tree, that they may not rub and injure the Bark.

If it be planted where Cattle may damage it, it must be secur'd by Bushes of black Thorn, or by a Hedge, or paling round it: for they will prevent many a Tree from growing, by rubbing themselves frequently against it; beside their injuring it by cropping it if in their Reach.

Farther,



Farther, to secure the Success of the Plantation, it will be proper to lay a Quantity of fresh cut Fern, or Pea or Bean Stalks, or any Thing of that Kind, all about the Roots. This serves to keep the Earth moist about them; and by Degrees these Plants rot and decay, and the Earth receives their Substance, which is wash'd in by Rains as a Manure, greatly improving the Soil, just when it is most wanted; and promoting the Growth of the Tree when there is the Fear of its being check'd by the Removal.

If the Place or Season make it inconvenient to get any of these Things to lay about the Root of the Tree, it is adviseable to lay a good Quantity of large Stones there. These answer the same Purpose in keeping the Ground moist; and they also press it down steady and firm to the Roots.

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### C H A P. IX.

#### *Of transplanting Trees at a large Growth, or at improper Seasons.*

**A**S there may sometimes be Occasion to remove Trees of a very large Growth, or at an improper Season of the Year, we shall add here the best Methods for doing either; and the Cautions that are necessary to be used to prevent the Loss of the Tree, which naturally would happen, if such Transplantations were set about rashly, and without the necessary Care.

When there is Occasion to remove a very large Tree, the Method to be taken is this. A Year before the Time let the Earth be open'd at some moderate Distance in Form of a Trench; so as to leave a Ball of Earth about the Stump, of five, six, or more Feet in Diameter, according to the Bigness of the Tree. When this Trench is dug to the needful Depth all round, and the Side Roots at that Depth are all cut through, let a Rope be applied to the upper Part of the Tree, and by the Strength of three or four Men, let the Tree be pulled on one Side till the Workman can get at the strait downright Root or tap Root. Then let him cut through that Root with his Axe, and when this is done, let the Tree be set up strait again. When it is up, let the Earth that was dug out of the Trench be thrown in again, and then

tying two more Ropes round the upper Part of it, drive three Stakes at some Distance in the Ground, and fastening the other Ends of these Ropes to the Stakes, the Tree will be able to stand against the Wind, which otherwise would blow it down; as which ever Way it is bent by the Blast, there will be a Rope to pull against it. In this Manner let the Tree stand till that Time next Year; or if this have been done in Time, and it be allowed to stand two Years, it is the better.

The best Season for removing it, is just after a good Frost. Let the Hole in which it is to be set be made ready; and the Earth about the Root well wetted before the Frost, that it may bind together in a firm Lump about the Root; and in this Condition let it be removed and set in the Hole where it must be secured by Ropes and Stakes as before directed.

If Trees are to be transplanted in Summer, the great Art is in preparing the Earth for their Reception. They must be taken up with all the Cautions already given, and the Earth should be wetted to make it hold together about them. Then in the Hole where they are to be planted, there must be a large Quantity of fine Mould mix'd with Cow Dung, and beaten up with a sufficient Quantity of Water to reduce it to a Paste.

When the Hole is thus prepared, the principal Branches of the Tree must be shorten'd; and it must be removed with a good deal of Earth about the Root; it must be set upright in this Paste, and fine Mould thrown in and pressed down upon it: then the Hole being filled up, is to be cover'd with Turf; and a Quantity of Stones laid all about the Bottom of the Trunk to keep the Ground moist, and to preserve the Tree steady.

In this Manner; and by these Methods carefully follow'd, Trees may be transplanted when of ever so large a Size; and at ever so improper a Season. But these are Occasions which seldom offer in the Husbandman's Way, Pleasure demanding them much oftener than Advantage. We have, however, given the Rules for doing it, that nothing might be omitted; and having thus treated at large of raising and transplanting Trees in general, we shall advance to a full Consideration of each Kind in particular; and of the peculiar Management each requires.

## B O O K II. P A R T III.

### *Of the several Kinds of TIMBER TREES.*

### C H A P. X.

#### *Of the Oak.*

**W**E have already spoken of the Oak at large among other Timber Trees, in delivering what in general concerns their raising; but we are here to consider that of this Tree in particular.

Numb. XIII.

We shall in this, and the succeeding Chapters, as much as possible avoid Repetitions of what has been said already in that general Discourse, reserving to each Head what is, in some Degree, peculiar to each Tree.

The Oak is a large Tree with a rough Bark, spreading Branches, and large Leaves, deeply wav'd

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wav'd at the Edges: the Flowers are considerable, they are a Kind of brown Threads: the Fruit is the Acorn, standing in a Cup, and growing in some Trees on a longer, and in others on a shorter Foot Stalk; from which Difference some have distinguished two Kinds of Oak. Others have, in the same Manner, divided the Oak into two Kinds, one of which rises more in Height, and the other, which they call the wild Oak, spreads more into Branches. But these are accidental Varieties, not distinct Kinds.

The Oak will grow in almost any Soil: this we see in Fact, because we find Oaks on all Kinds of Land. We see it on clayey, sandy, and stony Ground: but those who have made strict Observations declare, that in the clayey Soils it obtains most Firmness, but in these the Growth is slow. The best Earth for Oak, where there is Choice, is a rich Loam. This is a sound and commonly a deep Soil. Too much Wet is an Enemy to the Oak, so that it should be guarded against; and 'tis principally for this Reason that it grows best on somewhat rising Grounds, for they are naturally more dry than the absolute Flats on which the Wet lodges and remains.

When the Ground is too moist the Oak puts out most Branches, and the Trunk is defrauded of its due Nourishment; in very dry and exposed Places it grows low and stubbed.

The Timber in too moist Ground is softer, and in these hilly and barren Places it is harder than its usual Quality, but 'tis there of an uneven Grain, and less useful.

The finest Oak Timber is that which has grown on a firm good Soil, rather enclining to Clay than any other particular Quality, and where there is not too much Moisture.

The Oak is propagated three Ways; first, from Seed, or the Acorn; second, by raising in a Nursery, and then transplanting; and, thirdly, by taking up young Sets out of the Woods, where they have risen from the fallen Acorns, and are usually plentiful enough.

Of these Methods I altogether prefer that of raising the Oak from the Acorn, in the Place where it is to grow. The Oaks from the Nursery are commonly twice transplanted to come to their standing Place, and this gives them two Checks greater or less; and disposes them twice to an Unevenness in the Growth: as to the Sets taken out of Woods, they are the worst Way of all. Idleness or Frugality may tempt those who will not raise, or purchase the young Sets out of a Nursery to do this, but these wild ones having been rais'd under too much Shade, are usually very ill shaped; and as they are planted out into more exposed Places, they commonly get an ill Growth.

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## C H A P. XI.

### *Of raising Oaks by Transplantation.*

**I**F any one in spite of these Disadvantages will plant the wild Sets, the Method he is to take is to cut them off close to the Ground, with a sharp Knife, and by a flanting Stroke, as soon as

they are planted. This gives the Root Time to recover some Strength, and as it affords a new Shoot, that is often better than the original Plant. But in this Case the Disadvantage is plain, for it is evident that it would be better this Shoot rose from the Root than from a Stump.

Those who raise Oaks in a Nursery for Transplantation, must observe a different Method from what is to be followed by such as sow them where they are to stand. They are to proceed thus. Let the Acorns be shook, as soon as fully ripe; from a stout Branch of a well growing Oak; and immediately sown in the Nursery; for the Air withers them.

They are to be set in Lines, at two Inches asunder, and about two Inches and an half deep in the Ground. They will shoot the succeeding Spring, and they should be suffer'd to stand till that Time Twelvemonth: then they are to be transplanted into another Part of the Nursery, and set at eighteen Inches Distance, in Rows three Foot asunder. They are to be watered a little when first transplanted, but this must be carefully done, for too much Water is apt to hurt the Oak, especially when young.

The Oak is a particular Tree, and requires, as well as deserves, a particular Care in its Management. In many little Respects the Conduct is to be different from that observed in the raising the Generality of Trees; and it is to a Want of Regard to these, that so many young Oaks are lost more than of other Trees.

The young Trees thus transplanted are to be watered sometimes in dry Seasons, and kept clear from Weeds. It is also good to dig between the Rows: for this, by breaking the Soil, affords them a greater Supply of Nourishment, and at the same Time it cuts off the stragling or far-spreading Roots, which will make the young Trees bear their next Transplantation the better.

During the Time they stand in these Beds they are to be regulated in their Growth, but in this only a little is to be done. They who cut off the Head destroy the Tree, for if there be not a leading Shoot to conduct the Top, the whole will perish. Neither are many of the side Branches to be taken off, but only such as tend to too much spreading. The Planter is to remember that the Trunk of the Oak is to be his best Benefit; he must therefore cut off such very spreading Branches, as would draw the Sap away from it and starve it: but it is prudent to leave a competent Number of the others, to draw up the Sap. When an Oak in this young State is too close prun'd, the Head is always seen to grow over proportioned, and weighs down the Tree and spoils its future Progress.

When the Trees have thus stood about four Years; that is, when they are between five and six Years old from the sowing, they may be conveniently transplanted. They are at this Time of a pretty Size, and having been thus prun'd shew well. It is dangerous to move them in the common Way, when they are older, for the Oak bears removing, when grown to a Size, worse than any other Tree.

The Time for transplanting them is just before they begin to shoot; and it is prudent to chuse a showery Season: if no Rain fall they must



must be gently watered, as before directed, and flaked up to keep them strait.

This is the Method for raising Oaks by Transplantation; and when they are wanted for Beauty and Ornament, as for Chumps in Parks; and for Wilderesses in large Gardens, this is a very good Way, because they may be had of a proper Growth from the common Nurseries: or from the Owner's own Stock, rais'd there for other Purposes. But when Oaks are intended for Timber; and Use and Value are more studied than Ornament; 'tis by much the best Method to raise them from the Acorn, in the Places where they are always to continue.



C H A P. XII.

*Of raising Oaks from the Acorn.*

THE Directions which have been given for raising Trees in general from the Seeds, in the last Chapter, might seem here, and on the like Occasions hereafter, the Repetition of a great many needless Words; but in each we shall deliver whatsoever there is required particular for the raising of each Kind.

When the Oak is to be rais'd immediately from the Acorn, a different Method, and different Season are to be observed for sowing.

Let the Acorns be gathered when full ripe, from a thriving Tree, and immediately spread upon the Floor of a dry shady Room: when they have lain a Week, frequently turning them, let them be put up in large Garden Pots, with a Quantity of dry Sand, and laid by for the Winter.

Early in Spring let the Ground be marked out where the Plantation is to be made, and at the Distance of forty Foot every Way, let the Holes be open'd for receiving the Seed. These are to be dug two Spit deep, and the Earth well broken, four or five Acorns are to be put into each, and cover'd two Inches deep, and when they have shot, and acquir'd a little Growth, all the Plants, except the one best in each Hole, are to be taken up as directed at large in the last Chapter. And that single Plant in each Hole is to be nursed up for some Years with due Care.

The Head of these young Trees is to be suffered to grow, and none of the Branches are to be cut away, except such as spread out too wide, as in the Nursery; and if it happen that in spite of the Care in the Choice of those Shoots which have been suffer'd to stand, any one be uneven; the best Method is to cut it off at the Ground, and wait for a new and better Shoot.

A Plantation of Oak thus made, if the Soil be tolerable, is a Fortune for the Successor in the Estate; but it is not limited to that; Men enter too late upon these Studies, otherwise they might reap the Benefit of their Plantations themselves. If a Man would begin to plant at eight and twenty, and should live to see sixty-three, there is a Space of live and thirty Years, which is a Time for raising even an oak Plantation, slow as that is in Growth, to very considerable Value, though not to its full Price, or nearly to that.

It is not easy to give what can be call'd a middle Calculation for the Growth of the Oak, it differs so prodigiously in Respect of the Soil,

Situation, and other Circumstances. But this I can say from my own Knowledge, that Oaks are now to be seen in this Neighbourhood, which were planted thirty-four Years ago in the Acorn: And the least Tree among them is fourteen Inches diameter in the Trunk.

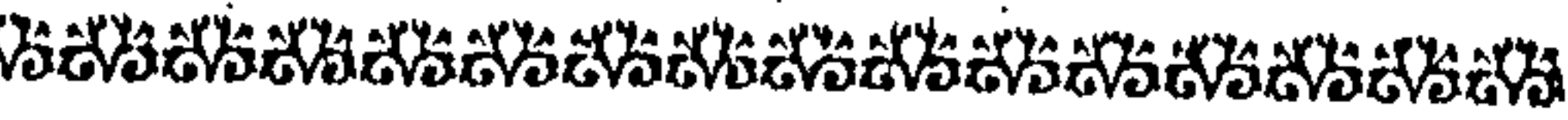
An Oak of this Bigness is but advancing toward the proper Time of felling, and towards its Value; but if the Necessities of the Owner induced him to fell these at this Time, the Price of the worst Tree among them would pay for the Labour and Charge of the Plantation.

If the young Plants, when they rise in these Spots, appear almost above the Ground, or stand too high with their Roots, the best Method is to lay up a Parcel of fine Earth against the Bottom of that which is the most thriving Shoot. This happens sometimes from the Acorns being not set deep enough; and sometimes from the Weather: for after a Frost the Mould will rise, and bear up the young Shoot with it.

Acorns are not to be buried too deep, especially in a moist Soil, for they often rot: and, on the other hand, they must not be set too shallow; for it not only makes the Shoot stand too high; but frequently the Field Mice find them out, and devour the Hopes of the Plantation.

The Quantity of Ground taken up by this Plantation, at forty Foot distance, is not to be supposed wasted: for though the Oaks will, in their larger Growth, require that Distance, they do not at first. For many Years Ashes may be rais'd upon the Ground between the Oaks, for Poles, and cut to a great Advantage. Underwood of all the shrubby or Coppice Wood Kinds, may also be planted for a Time, if the Ground be fit for it: or it may be graz'd, and will lose little of its Value for many Years. Nay the planting the Trees at this Distance is the only Way to preserve a Value in the Ground for these Purposes; and when the Soil is good, it will continue to yield fine Pasture.

For an Instance of this I need not send the Reader farther than to that elegant and noble Plantation BUSHY-PARK: where, all about the Cascade, he will see Oaks of a very noble Growth, at about forty Foot distance, more or less, and the whole Surface of the Ground under them as green as the finest Meadow.



C H A P. XIII.

*Of the Uses of the Oak.*

NO Plantation whatsoever exceeds that of Oak, when made in this Manner: and to those who will suffer it to stand a proper Time, none equals it in Value. By this Management the Trees will all rise with a single strait and upright Stem, and their Branches spreading every Way with a beautiful Regularity, make, when clothed with their large and fair Leaves, a beautiful Appearance. Their Shade is preferable to that of any Tree whatsoever: their very Imperfections and Excrescencies, the Oak Apples, Oak Cones, and Oak Grapes are beautiful; and the Air is perfumed and rendered healthy by blowing over them.

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Among the Excrescences of the Oak I have not followed the common Custom of ranking the Herb, call'd Mistletoe, because it is not an Excrescence, but a regular Plant, rising from its own Seeds; but whose Place of Growth is not the Ground, but the Bark of some Tree; and no Trees afford it so seldom as the Oak.

Its Fruit, which a good and well-grown Oak bears annually in vast Abundance, is an excellent Food for Hogs. No Fruit feeds them so well, it gives their Flesh also an excellent Taste. The Flavour of the WESTPHALIA Hams is owing to this Food. They are made from wild Swine that live in the Forests; and it would, doubtless, be an Improvement of our Hogs Flesh intended for that Service, if the Creature were fed with Acorns.

That they give a Flavour to the Flesh of such Hogs as eat them in Abundance, is not to be questioned; for our Country People, who are not accustomed to that Taste in Bacon, always feed their Hogs some Time with Pease after the Acorns, to take off the Flavour.

The Effect of Food on Creatures in giving a Taste to their Flesh, is not to be doubted. The Heath-Cock of GERMANY is not eatable in Autumn, except by the Peasants, because its Flesh tastes so strongly of the Juniper Berries he eats at that Season; and as to the Effect of particular Food on Hogs, an Instance is given in the Philosophical Transactions, of the very Bones of a Pig being ting'd red, by its eating Madder Root at a Dyer's.

The Hog is the Creature that eats Acorns most freely and naturally, and is best fed with them; but what Nature has meant as Food to one Animal, may, by proper Management, or in Necessity, be made Food to others; all Poultry will eat Acorns if broke small, and given them among other Food, and nothing fattens them more. They have also been given to Oxen, and other Cattle, among their dry Food; and we read that before the Cultivation of Land was so well known, they were, in Part, the Food of Mankind.

Their Effect in fattening the Hog is supported by sufficient Experience. A Peck of Acorns a Day, with a little Bran, will, it is affirmed, upon good Authority, make an healthy Hog encrease a Pound each Day in his Weight, for fifty or sixty Days together.

The Bark of the Oak serves the Tanner, and fetches a large Price; the Dyers also use it: and it has been discovered some Years since, that the young Branches of the Oak cut and ground to Pieces in a Mill, answer all the Purposes of the Bark, and that in as great Perfection on these Occasions.

We have mentioned Saw Dust among the Articles useful as Manures; and Experience shews that none is so excellent for that Purpose as the Dust of the Oak: this is natural enough, because the Oak is the most firm and solid of all our Timber. Those who have try'd the Experiment say also, that of the Kinds of Wood Ashes used in dressing of Land, the Oak claims greatly the Preference.

All these however are but, as it were, accidental Articles of Value in the Oak; its great

Worth is in the Timber; which in Solidity, Strength, and Soundness, exceeds all our other Kinds; and is therefore of all the most fit for great and lasting Uses. Of all Kinds of Wood yet known in this Part of the Globe, the Oak is in its Service the most universal.

Beside its prodigious Use in our Shipping, it is called for, on a thousand Occasions, in Buildings, and for Instruments. It resists the Injuries of Weather more than any other Wood, which is not a Wonder, for even the Fire takes Effect upon it much slower than on any other Timber whatsoever: and some of it is so hard that the best Tools will scarce work upon it.

In Water-works, where the Timber is exposed both to the Air and the Water, no Wood stands like the Oak: and no Wood is equal to it in the Support of Burthens. The Ebony and some other foreign Woods, when they are very hard and firm, cut as difficultly as Oak, but if they are try'd in the supporting of Burthens, they start and fly under half the Weight that a Piece of Oak of the same Size will support with perfect Safety.

Even the Defects, as they naturally appear of Oak, serve to give it Strength for certain particular Purposes. Thus it is not unusual for an Oak Trunk to grow a little twisted: this may be discovered through the Bark as it is standing, but is very visible when the Tree is fell'd and strip'd: the Trunk of such an Oak is useful beyond any other, for the supporting vast Weights. Where Posts and Columns are required for such a Purpose, nothing equals it.

In Buildings the straightest, finest, and evenest growing Pieces of Oak are usually wanted, and they bring their Price accordingly; but for Engines where a vast Strength is required, the Body of one of those stubbed, and rough grain'd Oaks, which are not fit for other Purposes, and which are so hard that a Tool will scarce pierce them, is superior to any thing.

There is no Oak, while sound, that is not fitted for some Purpose. Those Parts which will not do for greater Uses makes Pales, Posts, Coopers Ware, and Laths; all which bring their Price to the Owner: even the least Pieces are worked into the Pins and Pegs us'd in tiling, and that Way are of Value.

Oaks that grow crooked, and are firm withal, make what they call Knee Timber for Shipping. The knottiest and roughest Pieces are fit for Piles in Water-works; and Mill Wheels, and Spokes for other Wheels are made from the proper Pieces.

Beside all the Uses of the Oak in its various Conditions, consider'd as a Timber Tree; we are yet to consider it as a Part of the Coppice Wood Plantation; and no Kind is there more valuable. The Oak maintains its Character in every Condition, and is every where of Value.

When the Oak is sown among the Coppice Wood, to be fell'd with it at twelve or fourteen Years Growth, it yields excellent Poles for Hoops. 'Tis usual to make these of Ash, and some take Hazel; but the Preference is due to the Oak Hoop beyond all Degree of Comparison: the Ash does not exceed the Hazel for Hoops half so much as the Oak exceeds the Ash. An Oak



Oak Hoop will last out seven of any other Timber.

The smaller Kinds of Poles serve as Staves, and the least make our walking Sticks. The Root of the Oak where it is knotty and firm, has also great Beauty when used by the Turner or Inlayer.

Thus we see that this serviceable and universally useful Tree supplies us with Materials of all Kinds, as Timber, from the Ribs of a Man of War to a walking Staff, and from the main Beam of a House to the Pegs in the Tiling: not the least Particle of it but is useful. Even such as is fit for nothing else in the Coppice Oak is good for firing, whether split into Billets from the larger Pieces, or cut into Faggots it excels other Wood. The Charcoal that is made of the Oak is better also than any other.

#### CHAP. XIV.

##### *Of the Growth of Oak Trees.*

THE Growth of the Oak is not only very different on various Soils; but it has been found by nice Observation, to vary exceedingly at different Periods on the same Place. For Instance, an Oak has been observ'd to grow very freely and very well for twenty successive Years: at the End of this Time it has come to a stop, and has for ten or a dozen Years made little Progress. From this Time it has begun to grow again, and has continued in its usual Way increasing visibly in Height and Thickness.

This, though seeming to arise from some hidden Cause in the Tree itself, is really owing to the Soil. The Tree being planted in a good Earth, spreads out its Roots, and flourishes extremely well, so long as they remain within the Compass of that Coat or Layer of the Ground; but when they have pierced through that, and got into some other starving and poor Earth, they receive little Nourishment, and the Tree comes to a stand. It would continue so all along, were it not that the same Roots pushing deeper and farther, find good Soil again. Thus in the present Instance, the good Soil holds the Roots twenty Years, and affording sufficient Nourishment, the Tree all that while grows freely. At the End of that Time they penetrate into some unfavourable Layer; there they are kept twelve Years, all which Time the Tree barely lives, and hardly grows at all: till at the End of this Period the Roots piercing into another Bed of good Matter, supply the Tree as at first, and it then grows and increases again as it did from the Beginning.

It has been observ'd already, that the Oak will grow in any Soil, though it thrive differently according to the Nature of that Earth: but the Difference that is made by Soils in the Speedyness or Slowness of the Oak is not all: for the very Grain of the Wood is affected by it.

On barren Heaths, where the Bottom is stony, the Oak is ill-grain'd and coarse: the Grain of that Oak which has been rais'd in sandy Soils, is smoother and evenner than any: but that which has been sed by a good firm Loam, inclining to

clayey, is the right substantial and true grain'd Timber.

In the Forest of DEAN in GLOUCESTERSHIRE, there have been long since Iron Works, and a great deal of the Ground is cover'd with Slags of the Remains of those old meltings. These are taken up and wrought at present by the People who work the fresh Ore also, and that to a great Advantage. From thence has risen an Opinion, that these Slags were filled with a fresh Quantity of Iron from the Air. But this is an Error. The Truth is, that the old Workmen did not so well know how to get all the Metal out of the Ore, as our People do at present; or that having great Choice and Plenty, they did not trouble themselves to work near: however that be, 'tis certain that all the Iron now found in these Slags was left in them at that Time: the Occasion of naming them here is, that from these Masses of Slags, Oaks grow in Abundance in that Forest, and to a great Value. A great Part of their Roots are spread among those Slags, some piercing down below them, and others running through them to a better Ground that lies at a Distance: for the Roots of Trees spread farther than is imagin'd. In HAMPSHIRE, and other Places, Oaks are seen growing out of Stone Walls, and rising to a great Height, and to the containing very considerable Quantities of Timber.

Though the Oak will grow any where, we see how it will be stop'd in its Growth by the Interposition of a Bed of unfavourable Matter in its Way. These Things are not set down here for Curiosity, or to raise Mens Wonder, but for Use. As the Planter sees an Oak may be thus stop'd for a Course of Time, so that it shall be as good at twenty as at two and thirty Years Growth, it will be worth his while to take all Precautions to prevent such an Accident. We have directed the Use of an Auger for boring the Ground in Search of Marle, it will be advisable that the same Instrument be used in examining the Earth, where an Oak Plantation is design'd to be rais'd: and that the Planter may know to what a vast Size and Value Oaks will grow when the Soil favours them, not only in Condition, but Depth, we shall give him an Account of what Bigness some have arisen to in ENGLAND, as supported by unquestionable Authority.

In WORKSOP Park the Duke of NORFOLK had an Oak which spread almost three Thousand square Yards. Near a Thousand Horse might stand under the Shade of it: this is affirm'd upon very good Authority, and will appear the more credible from other Instances of the vast Size of some of those Trees. Prior in his OXFORDSHIRE, tells us of an Oak at CLIFTON, that spread eighty one Foot from Bough End to Bough End, and shaded five hundred and sixty square Yards of Ground. 'Twas computed five and twenty hundred Men might stand sheltered under it. The famous Robur Britannicum in Lord NORRERY's Park at RICEOT, was computed to be able to shelter between four and five Thousand Men.

The Mainmast of the old Royal Sovereign was ninety nine Foot long, and near a Yard thick,



thick, all of one Piece of Oak; and some of the Beams of that Ship were made from another Oak near five Foot thick, and were forty Foot in Length.

What must be the Value of these Trees is very evident; and there is no Reason why any Man who will take the Pains in raising his Oaks from the Acorn upon the Spot with due Care, and see that the Soil be perfectly fit for the Growth, may not leave an Inheritance of such to his Posterity.

The Oak requires less lopping than any other Tree, whether it be intended for Beauty, or for Use. Nature rarely over-proportions the Branches to the Trunk; and they spread with great Beauty, and grow in Value with it. If there be any Danger of a Branch growing to an immoderate Extent, so as to rob the Trunk of its Nourishment, that is seen in the first Years; and Directions have been given already for the retrenching such: for the rest, the Oak does best when left to Nature; and, according to the best Accounts that can be had, the common Opinion of the Time of its Growth, Duration and Decay, speaking in round Numbers, is not far from Truth. Oaks have been known to continue in a State of Growth and Increase ninety or a hundred Years; and we have Records of the planting of Oaks in some old Parks, that are of near three Hundred Years standing, and now are in a miserable State of Decay.

'Tis idle to suppose the exact Period is determin'd by these exact Numbers, but probably a Tree that attains its full Maturity so slowly, remains a long Time sound, and is long in decaying; and this the Firmness of the Oak Wood makes it the more natural to imagine.



#### CHAP. XV.

##### *Of the Felling of the Oak.*

**I**F it be true that an Oak continues growing a Hundred Years, certainly 'tis best not to fell that Tree till after the full Period of the Growth, when it can conveniently be suffer'd to stand so long; but with a View of Advantage, it is idle to think of its standing any longer: for certainly it can never be better than when at a full Maturity.

This then is, in general, the best Time of felling, but no particular Period can be limited for each Tree; for of those raised from Acorns of the same Bough, and sown in the same Soil, some will thrive better than others.

When a Quantity of Timber is to be felled, let it be first well examin'd, and let the Workmen begin with the decay'd Trees, if there be any, leaving the best and most flourishing till the last, because they can get no Damage in standing a little longer; and the others which have begun to decay, will be perishing every Day more and more.

More Things enter into the Consideration in the Article of felling the Oak than any other Timber; as the separating of the Bark for the Tanners, and the like. The best Season is

the latter End of APRIL, which favours the Separation of the Bark; it then rising freely and easily.

At this Season the Trees being mark'd out that are to be felled, the first Thing to be done is to cut off such Arms as may damage the Trunk in the fall. The Manner of doing this is, by beginning below close to the Trunk: when they have thus cut the Arm about a sixth Part through, they begin at the Top near the Trunk also, and when they come near meeting the other cutting, the Arm falls off without splitting.

When the Branches that may be hurtful in the Fall are thus removed, they are to go to work upon the Trunk, cutting it down as near as possible to the Ground, because the Length of the Timber is a very great Article in its Value, beside the adding to its Quantity.

When the Oak is down, its Trunk is to be strip'd of the Bark, which will come off freely at this Season, because the Sap is full and flowing; as the Bark is taken off, set it up in such a Manner as it may dry best. After this take off the Bark from the Branches that were left on; and set it up in like Manner: when this is done, let the Branches be cut off; and then cut it into Lengths for Sale.

It is a Custom in many Places to take off the Barks of Oak Trees as they are standing, a Year or more before they are felled. This is done to give a Strength and Firmness to the Timber, and is called in those Places a seasoning of it: but notwithstanding what has been said in favour of this Practice, I have never been able to find from the Accounts of those who have try'd, that it is of any Use.



#### CHAP. XVI.

##### *Of the seasoning Oak, and judging of the Timber.*

**T**HE Wood being thus felled and cut out, the next Consideration is the seasoning of it, which is done several Ways; but all of them require Time. Green Oak is fit for very few Purposes; and a great deal of its Value in many Cases depends upon the seasoning.

The plainest and most familiar Method is to trust to Time only, taking Care to prevent Accidents in the mean while. Thus let the Timber, cut as before directed, be laid up till dry in a careful Manner. Let it be taken off the Ground at a dry Time, and laid up in an airy Place, but out of the Reach of the Sun, and defended from the Winds, both which crack it in the drying. Let Blocks be put between the several Pieces, to give Passage to the Air. If this be omitted, they grow moist and mouldy, or breed Toadstools. In this Manner Time will take a proper Effect, the Timber will shrink gradually and regularly, and being thus season'd, it will stand when it is employ'd in Building, or on other Occasions.

Another Way of seasoning Oak Timber is by burying it for some Time under Ground: but this



this must be done in a dry Soil, otherwise it will require more seasoning when it comes out than it did when it was put in.

The best Method of all for many Purposes, and particularly those which require the best season'd Timber, is that we learn'd of the VENETIANS, which is called the Water seasoning. This is done by sinking the Timber under Water; and no Way is so good to prevent its splitting. The VENETIANS from whom we learn'd this, keep the Timber for their Sea Service two or three Years under Water before they use it, and then it stands firmly.

The Water seasoning is commonly done in ENGLAND in this Manner. When the Oak is cut into Boards, or Pieces, they sink it under River Water for fourteen or fifteen Days. Then they take it out, and lay it up carefully to dry in a cool airy Place, as directed in piling up the fresh Timber; preserving it from Winds and Sun, but leaving the Air free Passage amongst it.

Oak that is cleft is not so apt to split and crack as such as is entire: and round Pieces are always more ready to crack than such as are squared. These are standing Rules, and the Workman is to conduct himself in his Choice accordingly: Pieces that are bored through are found seldom to split. In general the more the Oak is in its natural Condition, the more liable it is to split; and the more it has been cut and wrought, the less.

Burning the Ends of Posts of Oak that are to be let into the Ground, has been accounted an excellent Method to preserve them a long Time; and some have carried this Practice so far, as to burn the Ends so deep as to impair their Strength. It is at present much disputed by those who pretend Experience on their Side, whether this Practice be of any Use at all. If not, 'tis a great deal of Trouble thrown away.

This burning naturally preserves that Part of the Post from the Worms by which it is subject to be gnaw'd under Ground; and the Dutch to prevent the same Accident under Water, cover over their Piles and Ship Bottoms with Pitch and Tar; on which they sprinkle Sea Sand with Powder of Sea Shells among it, and Flakes of Iron, such as fly off in the hammering.

In the Choice of Oak Timber, the Purchaser should examine the Weight and the Grain, the heaviest Timber in this Kind is always the best for Purposes that require great Strength and Soundness; and the smoother and evener the Grain, the better for most Occasions. Oak is not to be trusted in any nice Works, till it has been well season'd: and that from full grown Trees, is preferable to such as has been cut from smaller. But when the Tree has stood beyond its Time, the Wood becomes somewhat brittle; this is the first Tendency in Oak to decay.

CHAP. XVII.

*Of judging of Oak as it stands.*

THIS is an Article of great Consequence very frequently, and nothing is so difficult: it is a common Thing to purchase Trees standing; and in Oak 'tis of great Importance to be able to guess at their Value. Where all is good, nothing would be so easy, for the Question might be answer'd by measuring, instead of guessing, but nothing is so capable of deceiving as a Tree while it stands. There may be many Infirmities which 'tis impossible to discover till it is down; and which then greatly lessen the Value. Such as may be discover'd we shall point out; as also the Signs of Decay:

In the first Place, if the Head of the Tree be in any Part dead, 'tis a shrewd Sign that there are more Faults in the Body: in this Case it is a very good Method to bore into the Trunk with a small Piercer made Auger Fashion, and observe the Condition of what it draws out.

If in any Tree there be a swelling Vein perceiv'd rising above the Level of the rest of the Tree, and cover'd by the Bark, it is a Sign all is not well within. When this Vein twists about in the Manner of a Stalk of Ivy, it is worst of all; and seldom is seen but where the Heart of the Trunk is rotten.

Finally, another very good Method of judging is, to open the Earth about the Roots; and examine in what Condition they appear. If they are fresh, sound, and full of Juice, it is a Sign all is well above; but on the contrary, when many of them are found decay'd without any visible Cause in the Ground; when some of them are rotten, brittle and mouldy, all is wrong in the Body of the Tree. This is a Part not so much attended to, but a Decay here is a more fatal Sign than the Deadness of a Part of the Head.

Upon the whole, a great deal is to be judg'd by the general Aspect, and that much more by those who are accusom'd to these Things than by Strangers. There is a Look of Health in a Tree that is perfectly well and sound, which no other perfectly has. And tho' People who should be Judges are often deceived; yet it is their want of Observation, or their want of Knowledge that often leads them to it. There will be Faults which no Person whatsoever can discover till they are seen in cutting through the Tree; but the greater Part of those which debase the Value, are not of this Kind: they may be guess'd at least, if not certainly known, from some one or another of these Marks on a careful Inspection.





## C H A P. XVIII.

*Of the Elm; its Kinds, and proper Soil and Situation.*

**N**EXT to the Oak the Elm is the most universal of the ENGLISH Timber Trees. It is of all Trees the most common in many Parts of the Kingdom in Hedge Rows; and is thence the most familiar to the Eye of all the Kinds.

The Elm is not a Tree remarkable either for Flowers or Fruit. Both are inconsiderable. The first scarce at all regarded; and the other rarely minded; unless where fallen in Heaps under the Tree. The Flower is little and hollow, with some Threads in the middle; and the Fruit which comes after it is a flat leafy Case, having in the middle a longish Seed Vessel, somewhat like a Pear in Shape, with one Seed.

We have no less than five Kinds of Elm common in one or other of our Plantations. Some in Hedge Rows, others in Coppices; and some in Avenues and Plantations intended for Ornament. It is of great Importance to the Planter, who considers these Things with regard to the Profits that may arise from them, to have a perfect Knowledge of these Distinctions; and to chuse the proper Kinds according to his several Occasions. One being preferable on some, and others on the others.

The five Kinds of Elm are these. 1. The common Elm. This is a tall well growing Tree, with broad rough Leaves. 2. The narrow leav'd Elm; this has small and narrow Leaves, and is called by some by way of Distinction, the ENGLISH Elm. 3. The DUTCH Elm; this has broader Leaves than the common Elm, and as rough as they. 4. The Witch Elm; which has very small and broad Leaves: and, fifthly, the broadest leav'd Kind of all, which is called the Witch Hazel.

All these succeed extremely well in our Plantations, but it does not appear from the earliest Accounts that any one of them is a Native of the Kingdom. Some of them are taken into Gardens for Hedges; and the Nursery Men who spoil many a handsome Tree for Curiosity, have found the Way to get them with yellow and white, variegated, or as they call them, striped Leaves.

The common Elm, the narrow leav'd Elm, and DUTCH Elm, are best for ordinary Plantations; the two others, namely, the witch Elm, and witch Hazel, do best in Woods. These two grow very well among other Trees; but the other Kinds, though they succeed extremely well elsewhere, and will bear to be planted in Rows very near one another, do not thrive in Woods.

This is a singular Observation, but it is not difficult to be explain'd. The Elm, when intended for long Growth, must have free Air, and a large Scope for its Roots where there is Plenty of Nourishment. For this Reason several Elms standing very close to one another thrive, because they are yet open to the free Passage of the Air from each Side, which they

are not when choaked up every Way in Woods: and their Roots here can spread to a Distance under the Turf, and find Nourishment in Abundance, which they cannot do in Woods, where every Inch of the Ground is full of Roots of other Trees.

The Elm is very hardy, and full of Life: but it requires a great deal of Nourishment; scarce any Tree more. It will send out its Roots a vast Way to search for it, but then it must be supplied in Plenty in those Places. Thus it is supplied where other Trees are not planted about it, but not where they are. This is the sole Reason why the Elm succeeds excellently in Hedge Rows and Avenues, but not at all among the other Trees of a Wood. Far from hurting one another by being planted close in Avenues or Hedges, they are found to thrive the better: for they thus defend one another from Winds, and are observ'd to grow straiter and taller in these Places, than where they stand single.

Though the Elm will grow any where, yet it requires a good Soil and Situation to thrive. When too much expos'd, as upon hilly Lands, it does not prosper any Thing nearly as in lower Grounds, neither will it succeed to the Planters Wishes in a hot dry Soil. It will live in sandy or gravelly Grounds, but he knows little of his own Interest who plants it there. In some Places the Elm has been observ'd to grow very poorly, though the Soil was good, but there has been a bad Bottom.

The Soil the Elm loves, and in which it prospers to the utmost, is good rich Mould; and the Situation that most favours it, is a level and somewhat low Ground, for it loves Moisture. In the Hedge Rows of such Lands Elms will yield a vast Advantage. They will often grow very well under the Advantage of that Situation, even where the Soil is not such as best suits with them. The Husbandman may know by the Growth of his Neighbours Elms, whether they be a proper Plantation for his own Grounds; for where they grow tall and strait, they also grow quick; and, on the contrary, where they are low, stubbed, and ill-shap'd, they grow slow: this is his great Consideration. For in one Place he will have good Timber in a little Time, and in the other, he will, after a great while, have much less in Quantity, and that from its ill Growth also, less Value.

Let him therefore plant Elms only in favourable Soils, and good Situations; in Places not expos'd, in light Earth, and where there is Moisture. There are Trees enough for his hilly Places, and dry Soils, as will be seen hereafter; for in such the Elm will never thrive as in others.

In Choice of the Kind, let him prefer the ENGLISH Elm, either of the broad or narrow leav'd Kind to the DUTCH. In this I shall seem particular, contradicting the vulgar Practice. It is supposed the DUTCH Elm thrives quicker, but this is an Error. For the ten or dozen first Years the DUTCH Elm will out-grow the ENGLISH, but that is all. I have seen two planted together of equal Size, and equally thriving Trees: for ten or twelve Years the DUTCH has thus out-grown the ENGLISH; but after that it grows more slowly; and, on the contrary,



contrary, the ENGLISH more quick: by eighteen Years old the ENGLISH Elm had greatly the better of the DUTCH; and at this Time 1748; both being of three and twenty Years Growth, the ENGLISH Elm exceeds it by a vast deal.

The Planter may here take this Lesson, that if at any Time he have a Mind to cut the Elm while small, the DUTCH is best, but this is not the common Design. When rais'd for Timber, the ENGLISH has the Preference: and there is another great Difference, the Timber of the ENGLISH Elm is much better.

If any one is determined to have the larger Elm in Coppices, though I have already observed the witch Elm and witch Hazel are fittest for that Use, he must plant them only at the Edges of the Piece, for they will not do in the Middle; and for this Purpose the DUTCH Elm is better than the ENGLISH, for the Reason given already; which is, that in twelve or fourteen Years, the common Time of Growth of a Coppice Plantation, it will be larger than an ENGLISH one.

The ENGLISH Elms are altogether to be prefer'd for Timber Trees, and of the two Kinds of them the careful Planter is to chuse the broad leaved for the richer and moister Soils, and the narrow leaved Kind for the dryer and poorer. If he will plant Elms in his hilly Hedge Rows, the narrow leav'd Sort will grow better than the other. For Parks and Avenues the broad leav'd Elm is to be prefer'd, because it is the more beautiful, and naturally the more regularly growing Tree.

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## C H A P. XIX.

### *Of the Propagation of the Elm.*

**T**HE Propagation of the Elm is exceedingly easy, for it may be rais'd any Way that any other Tree whatsoever can. It will grow from fresh Poles of it stuck into the Earth, at a proper Season, in the Manner of the Willow; and may be rais'd in great Abundance, by burying a large Piece of a fresh Branch in the Ground, at a proper Time of the Year, and in a good Place.

It may be rais'd in the Nursery either from Seed or by Suckers, and it bears transplanting perfectly well; so that the Planter may take his Choice of any of the following Ways.

If he use a Nursery let it be on a Piece of even Ground well fenc'd; and order'd as before directed. Many say the Elm bears no Seed, and some have written so, but that is a strange Error. Whoever walks in an Avenue of well-grown and thriving Elms in APRIL, will find the Ground cover'd with the Seeds of the Trees, in those thin leafy Cases I have described as holding them. To get his Seed let him mark out a very well-growing Tree, and watch the falling of these Parts. Let a Quantity of them be gathered, and directly sown in the Nursery in Rows, at a small Distance and very shallow, the Earth being only just raked over them.

They will shoot in great Abundance, and are after a little Time to be thinn'd: the Ground is

then be kept clear from Weeds; and at two Years Growth they are to be removed into another Part of the Nursery, planting them at two Foot Distance, in Rows four Foot asunder: and here they are to be kept till they are of six or eight Years Growth, at which Time they will be fit to transplant into the Places where they are to remain.

The Nursery must be, all this Time, kept clear from Weeds, and the Ground dug every Spring between the Rows, which will greatly assist their Growth: and from Time to Time they are to be prun'd up, cutting off all the large straggling Branches, that would hinder their upright Growth; in which both the Beauty and Value of an Elm consist. The Elm is, while young, to be prun'd much closer than the Oak; but even this is not to be wholly deprived of its Shoots; for a young naked Trunk, with only a Twig at the Head, will never rise to be a fine Tree. Some small Shoots must be left on, otherwise the Sap all runs up, none staying to encrease the Trunk, and the small Top that it has left is too heavy for the Support of its weak Stem: this bows down therefore, and the Tree will grow for ever crooked.

The common Way of raising the Elm is from Sets, which grow in vast Abundance from the Roots of the old Trees in Hedge Rows, where the Soil is favourable. Poor People take these up in many Places, and sell them to the Nursery-men, who thence raise young Elms for Sale. The best Time of removing these Suckers is toward the End of OCTOBER; but the Trees thus rais'd are seldom so good. The Way from Seed is very easy. And the Plants sown in Spring will be up by the Beginning of AUGUST, and will stand the Winter of themselves; though if a little loose Straw, or other such Matter, be scattered over them by Way of Defence, they will succeed the better.

Those who would raise Elms from Stakes should cut them about six Foot long, and of the Thickness of a Child's Wrist, striking them off at the Bottom by one slanting Stroke. These being stuck down in a moist and mellow Earth in Spring, will shoot very vigorously, but irregularly. This is to be done early in the Season, and in a rich and somewhat damp Soil.

In like Manner those who raise Elms by burying the Branches, or larger Boughs, or the Trunk of some small Tree, must chuse a good Earth, where there is some Moisture, and the Spring Season. In this Earth they are to dig Trenches of a Foot deep, and to lay in them a Piece of six, eight, or ten Foot long, of a large Bough, or of the small Trunk of an Elm. They are to cover this up with the Earth taken out of the Trench, and watering it once or twice leave it to Nature. There will rise many young Shoots in a few Months, from every Part of the buried Wood. But these are Methods to be used only to suit particular Purposes.

Those who would spare the Trouble of sowing the Elm, by taking up wild Suckers, had better do this themselves, than purchase them of others; and better prepare for the getting them than take them as they happen to rise.

The Way to prepare for them is this. Lay bare some of the large Roots of a tall and thrive-



ing Elm, and chop them with an Axe one fourth Part through in several Places. Put a little Piece of Wood by way of Wedge, or a small Stone, into every Nick, thus made with the Axe, and then cover the Roots up again with Mould about three Inches thick. There will rise from each of these Nicks a great Number of Suckers, which at two or three Years Growth may be taken off and transplanted.

Another Way of obtaining Suckers in Plenty is this. Dig a strait Trench at some Distance from an Elm, and the Roots having been wounded by this, and being laid bare will send up a vast Quantity of Suckers. These are to be cut off from the old Roots, and transplanted at two Years Growth, and they seldom fail to produce good Trees.

We have mentioned these several Methods of propagating the Elm, to shew how easy it is to raise a Supply for Plantation: but there remains yet one other Way to be nam'd, that is, by Layers; for, to go regularly to work, the Way is to raise the young Elms either from Seed or by this Way; they being, by one or other of these Methods, more certain of Growth when transplanted, and of being strait and well-bodied Trees than any other. To raise a Supply of Elms by Layers, the regular and certain Method is this.

Let a small Piece of Ground be dress'd carefully for receiving the Roots and Stumps of some Elms, which are to furnish Shoots for Layers: these Roots, with their Stumps, are called the Stools.

The Soil of this Piece of Ground should be light, but with some Degree of Moisture; and it should be trench'd, and a little well rotted Dung buried in it. When this Ground has been clear'd from all Roots of Weeds, and laid level, the Plants must be let into it at about eight Foot Distance. The Season for this is Autumn, and being a little watered, and the Ground dug now and then about them, they will, the next Spring, make a great many vigorous Shoots.

These Shoots are to be laid, and the proper Time for that is when they are of about two Years Growth.

At this Age, in the Middle of FEBRUARY, they are to be laid in this Manner. Each Shoot is to be slit a little Way, and then buried under the Mould. Five or six Inches Depth of Earth is to be laid over the Shoot; and its Top is to rise a Foot out of the Ground.

When all the Shoots are laid the whole Stool is to be well watered: and this is to be repeated at Times when it shall appear most necessary, during the Summer; and by this Means, the Elm being a very lively and vigorous Tree, these Shoots will all have taken Root by the following Autumn, at which Time, when the Leaves are fallen, they are to be taken off and planted in the Nursery, at a Foot and half Distance, in Rows three Foot asunder; where they may stand till they are of a Size to remove into the proper Places.

This is the whole Trouble of that Practice, call'd by the Gardiners and Nursery-men, laying; and it is idle for any one who intends to plant many Elms, not to do it for himself: a

few Stools thus planted will yield, every Year, a great Number of young Elms, with scarce any Trouble.

If at any Time a Shoot will not lie readily, it is to be pegg'd down with a wooden Hook or two. Instead of flitting the Shoot some twist it; and in other Cases a Wire is tied tight round it, and Holes pierc'd through and through with an Awl; or the Shoot is lightly cut round. Any of these Methods will do, for all that is needful is to give the Shoot a Tendency to push out a Root at the Place where it is laid: and when that is done, and the Roots have some Strength, it is to be cut off from the Stool, and transplanted into the Nursery, to arrive there at the proper Growth for its last Removal.

Though early in the Spring be the best Season for laying the Elm Shoots, it may be done with Success in Autumn: and although Spring is preferable for the Elm and other very vigorous and quick-shooting Trees, yet for others the End of OCTOBER is better; because they have then the whole Winter to prepare for rooting, before they are called on by the Warmth of Spring to shoot out Leaves and Branches.

That there is some Sap rising all the Time from OCTOBER to the MARCH following, which is the Season when the Spring Shoots are preparing, is plain from this, that there is a continual Waste of Sap from the live Branches of Trees at that Time: for if they be cut off, and the cut End seal'd up, that no Moisture gets out there, still there will be a large Quantity, considering the Season, evaporated; and the Branches will grow dry and lose their Weight. Doubtless the same happens while they are on the Tree, as is thus found when cut off, and there must be a Supply for this from the Root.

Now as it is plain there is some Sap sent into the Shoots at this Season, and that it does not force out Buds or Leaves, nothing is more natural than that it should spend itself in sending little Roots from the wounded Part of the Shoot, which is quiet and warm under Ground.

This is a substantial Reason for laying many Trees in Autumn; but for such as the Elm that thrives so freely, and will send out Roots at any Time, the Spring is early enough. I have named the different Seasons, and explained the Reason here for the Sake of the Husbandman's general Knowledge. Such Trees as do not root freely in the Layers, may be best laid in OCTOBER; the others in Spring.

Having thus once delivered, at large, the Method of raising a Tree by Layers, it will be understood when only mentioned on succeeding Occasions. It has been judg'd right therefore to be the longer in these first Chapters upon the Propagation of Forest Trees, that we may be the shorter on others.

Some have pretended to deny the Rise of any Sap in Winter: and these might very well object to the laying Trees in Autumn; for if no Sap rose they would be in the Condition of dead Sticks at that Time, and their buried Part would be in Danger of rotting. But the contrary most evidently appears. It is found by Trial that the Holm Oak, and the Cedar of LEBANON will grow by grafting on the common Oak, and on the

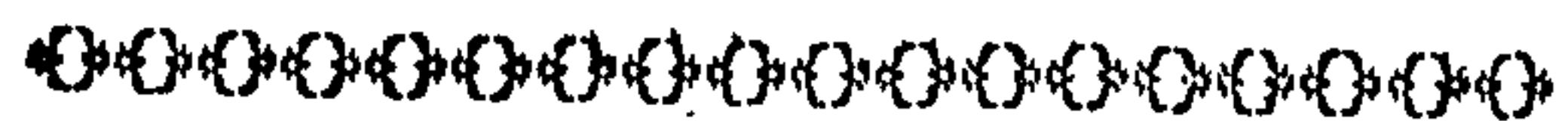


the Larch Tree. And although the Oak drops its Leaves in Autumn, the Holm Oak grafted on it keeps green all Winter; and just the same happens in the other Case; for though the Larch Tree drops its Leaves in Autumn, the Cedar being an ever-green like the Holm Oak, keeps its Leaves when grafted on it. It is very plain therefore, that some Sap arises from the Oak, and the Larch Tree all Winter, otherwise these Grafts could not keep their Leaves; for they could not keep them without Sap, and they have no other Supply. Less Sap satisfies Evergreens, because they evaporate less; but still it is plain there must be some.

We would have the Farmer understand every Thing he is advised to practise. And with that Design this Matter is so carefully explain'd to him. He sees plainly that some Sap rises in all Trees in Winter: therefore when we shall on any future Occasion direct the raising a Tree from Layers; and order it to be done in OCTOBER, let him not suppose it an Error, or a careless Direction; for there are many that will succeed best that Way, though the Elm does better in Spring.

The Husbandman has here before him the several Methods by which the Elm may be propagated. But of all these the two which are preferable, are from Seed or by Layers; and in his Choice between these, he is to be determin'd from his own particular Circumstances and Designs. If he intend a Plantation of Elms to be made at once, and shall not think of repeating that Work, the best Way is raising them from Seed: but if he intend to continue from time to time planting, he is to prefer that by Layers. For the Seedlings are a Stock for once; but the Stools for laying being once prepared, will afford a fresh Supply every Year for his Life.

If the Farmer at any Time want to set a few Elms only, it is not needful he should be at the Trouble of either of these Methods: but his best Way will be to take up Suckers from the Hedge Rows, chusing the straightest and most promising.



## CHAP. XX.

### *Of the Uses of the Elm in Plantations.*

**T**HE Elm is a valuable and useful Tree; both for the Field and Garden: and none is more to be esteem'd for Plantations, where the Eye is to be pleas'd, as well as the Estate improved by them.

No Tree is so good as the Elm for Avenues and Walks, because, with proper Care, none grows so upright and regular; and none will, in so short a Time, reach so considerable a Height.

No Tree is better for Hedge Rows, when the Soil and Situation are suited: for by its upright and regular Growth, it is an Ornament to an Estate; and its Branches not spreading too wide, especially in the usual Way of lopping in Hedge Rows, it does not shade too much of the Crop in the Field; and yet it is leafy, and affords a sufficient Shade, for Cattle,

In Parks also, the Elm makes a very beautiful Appearance in Clumps, or singly: but for this Purpose 'tis best not to lop it up so close; but to leave some large Branches; or from twenty Foot upwards to suffer it to spread as Nature pleases. In this Way Elms will stand many Years, and look very beautiful, but they are apt to grow hollow: the Verdure will often keep fresh when the whole Heart of the Tree is gone; nay, when nothing remains but a Shell of Bark. But this is not wonderful, for the Bark conveys up the Sap.

The young Shoots of the Elm are a very acceptable Food for Cattle; and they may often be cut for this Purpose to the great Profit of the Farmer, when other Fodder is expensive.

The Loppings are very good Wood for Fuel; and an excellent Kind of Charcoal is made of the Branches.

These are the ordinary Uses of the Elm in the Field, exclusive of its Timber. About Houses it is valuable because it is very pliant; and may be made to grow any Way.

It is excellent to plant by way of Defence from Winds. For, if left to spread its own Way, its growing close, and its great Number of Branches, are an excellent Shelter; but if cut and train'd up, it may be raised into a Hedge of forty Foot or more in Height, and of such a Compactness, as to keep off every Blast from the Dwelling.

But Caution must be taken that Elms be not for this Purpose planted too near the Garden, for they will rob the Fruit Trees of their Nourishment; and spoil the Beauty of both Grass and Gravel. No Tree spreads its Roots so wide as the Elm; and these will therefore interfere with those of the Wall Trees, and deprive them of their Nourishment; and as no Tree in the World is so apt to send up its Suckers from the Roots, these will rise every where among the Grass, and through the Gravel, being an eternal Plague to the Gardiner, and continually defacing the Beauty of the Walks.

A vast Advantage of the Elm about Houses, is also that it may be transplanted when very large; no Tree bearing this so well. But let the Planter in that Way receive this Advice, always to get his large Trees from a Nursery; because having been there prepared for transplanting, they will rise with a good Root; whereas those from Hedge Rows often fail when taken up at any Size from the Irregularity of the spreading.

In this Place also, it may be proper to insert the necessary Cautions about removing those Trees for the last Time, or to the Places where they are finally to stand. Now, on this Occasion, whether they be very large, or of the common planting Size, which is at seven or eight Years Growth: this must be done in the Beginning of OCTOBER; their Heads must be lessen'd, but the leading Shoot must not be taken off; nor must the other Branches be cut too close. Their Roots must not be buried too deep; and especially if the Soil be moist. It is better in this Case to plant them shallow, and raise a Bank or Hill about them. When this is done, they are to be staked as directed for the Oak,



Oak, and by these Means there will scarce ever a single Tree fail either in the Garden or Field.

The best Season for lopping the Elm is about the Middle of JANUARY; and the oftener this is repeated, the taller the Tree will grow. The Side Boughs are to be cut off freely in these Loppings, but the Tops must be spared: when they are cut too near, they frequently let in Wet, to the Destruction of the Tree. In SPAIN they have Plantations of Elms many Leagues in Length, which are kept constantly and frequently lopped, and by their even Trunk, great Height and bushy Tops, make a noble Appearance.



## CHAP. XXI.

### *Of the Value of the Elm in Timber.*

**W**E have consider'd the Elm in a Variety of Uses while standing, we are now to examine into its Nature and Value as Timber.

The best Season for felling the Timber Elm is in the Beginning of DECEMBER. No Tree is so vigorous as this; and therefore the fit Season for cutting it down is to be consider'd in a particular Manner; for to give the greatest Value to the Timber, the Sap must be as much as possible at rest when it is cut: and this is the Season when it is in that State.

As to the Kinds of Elm for Timber, we have observ'd already, that the ENGLISH Elm is better than the DUTCH, for the Wood is sounder. Of the two common ENGLISH Kinds rais'd for Timber, the Difference is this, the broad leav'd Elm affords an even grain'd Plank; but the Timber of the narrow leav'd Kind is harder.

Though these are the only two we usually raise for Size, we need not be ty'd down to them, for the witch Elm, which we commonly confine to the Coppice, will afford an excellent Timber: this is not at all inferior to that of the common Elm, and is of the smooth grain'd Sort, or more like that of the broad, than the narrow leav'd Kind.

The witch Elm requires the dampest Soil of any of the Kinds; but in such Ground it will out-grow the common Elm. It is this Quickness of Growth that has given it the Preference above the other for a Coppice Shrub. But it will in such Plantation rise to an excellent Tree, fully equalling the Elm in Bigness, and in Value.

The Planter will do well to consider this, and to raise Supplies of this as well as the other Kinds, and to set it always in the dampest Places where his Elms are to stand. For this Purpose he should sow the Seeds of each Kind; and dispose them properly, which will vastly increase his Profits; or if he raise them from Layers, he should have two or three Stools of each Sort; so that he may take off his Layers from Kinds fitted to the Soil, which can never be done if he buys them.

The Elm Timber is an exceeding strong and sound Wood; and it is very durable either in Places where it is kept always wet, or where it is

always dry: but it does not bear sudden Changes from one Condition to the other. It endures a vast while in Water Pipes, which are always wet and under Ground, and in many of the common Uses where it is never wetted at all, 'tis in a Manner everlasting. Its Toughness recommends it to the Wheelrights and Millrights: and it is very useful for Dressers and chopping Blocks, because it will not break away in Chips.

There is a vast Difference between Elm Timber cut in the Middle of Winter, and that at other less favourable Times. The Trees are in felling to be cut off as close as possible to the Ground; and Care must be taken about the Fall, that they are not hurt by their own Boughs, or Things in their Way, for they come down with a great Weight by reason of their Tallness.

It is made by some a great Objection to the Elm, that it is apt, as before observ'd, to be hollow: but this may in a great Measure be prevented, by observing the Directions already laid down, in the Articles of the last Removal and the Lopping. Twenty Elms become hollow by bad Management, for one that is so from Nature. The common Occasion of it is, the cutting the leading Shoot; or some upright Branch of the Head; or some nearly upright Branch elsewhere: these let in the Wet at the Wound, and the Decay which begins there, runs down to the Bottom of the Tree.

When a Branch has thus injudiciously been taken off, which endangers the Tree, the Method to prevent that Mischief is to cut it off again close to the Trunk, and cover the Wound with Lead, or Oil Cloth.

As the Elm so ill bears cutting off its upright Branches, it does but very badly take the topping for a Pollard. 'Tis indeed one of the worst Trees for this Use: but some will cut it in that Manner. In this Case many die in the Operation; and the rest, though they seem to bear it at first, commonly grow hollow afterwards, and decay entirely.

When the Farmer intends to use the Shoots and Branches of the Elm as Fodder for his Cattle, he should cut them about AUGUST, and let the Leaves dry on them. These will keep till Winter, and the Cattle will eat them rather than almost any other Food, and thrive upon them extreamly. Hogs will eat them green, and fatten upon them very quickly.

People who are fond of relating strange Stories, have asserted that Elms will grow from Chips of the dry Wood. This is not true, but what gave rise to it is a very familiar Observation. Elms are often removed soon after they are felled; and sometimes when they have shot out from the Knots, as they will do as they lie on the Ground. When these are squared for Use, those knotty Parts being trodden into the Ground by the Workmen, will shoot: but the rest of the Story is not true.

The common broad leav'd Elm in a rich and somewhat moist Soil, will grow to a great Bigness. There have been seen whole Rows of them in Hedges, that were three Foot square for forty Foot in Height; and there are authentic and unquestionable Accounts of an Elm in



OXFORDSHIRE, which near the Ground was six Yards in Diameter. Dr. PLOT who gives us this Account, mentions a witch Elm very nearly of the same Bigness: he says it was at the lower End seventeen Yards in Circumference, forty Yards high, and contain'd near a Hundred Ton of Timber.

The Elm is not so tedious in its Growth as the Oak, and the Demand for its Timber is very considerable, though the Price be but moderate: the Quantity used for Water Pipes alone is surprizing. There is therefore great Encouragement for the Husbandman to plant it. 'Tis easily done, the Expence almost nothing: the Ground it takes up in Hedge Rows in the same Manner nearly nothing, and it grows quick, and may be cut down at any Bigness to considerable Profit.

## C H A P. XXII.

### *Of the Ash, its proper Soil and Situation.*

THE Ash is a tall and stout Tree when suffer'd to grow freely. Its Leaves are every one composed of several smaller, which stand on each Side a Stalk with an odd one at the End. The Flowers are small and inconsiderable. They consist only of a few short Threads. The Fruit grows in other Parts of the Tree, is what we call the Ash Key, hanging in Bunches.

Though we have several Kinds of the Elm, there is but one Sort of Ash wild in ENGLAND, or fit to be cultivated in Hedges or other Plantations for its Timber. The Gardiners have found the Way to stain its Leaves, and then call it the variegated Ash. The flowering Ash, and some other Kinds, are also kept there for Beauty; but with these the Husbandman has nothing to do. There is one from NEW ENGLAND with sharp pointed Leaves, and another from CAROLINA with broad Keys. The ITALIAN Ash which affords Manna, is also distinguish'd by having rounder Leaves; but with these he whose Intent is to raise Timber has no Concern; the common ENGLISH Ash is his only Kind.

The natural and favourite Soil of the Ash is, a light and rich Mould, but it will grow any where: we find it in sandy Ground thriving very tolerably, and also on rocky and stony; but when it has its own natural Earth about it, the Growth is much quicker. In a good Soil there is scarce any Tree that will in less Time rise to so considerable Value. A Hundred Years is allowed for the Growth of the Oak. The Ash, on the contrary, will rise to its utmost Perfection in between forty and fifty, when it has been carefully manag'd at first, and the Soil suits its Growth.

We see Ashes on the most barren Mountains, and it is fit the Husbandman should know they will live on such Places; but they do not thrive there either so quickly, or so regularly as in better Ground. In general the Planter should be inform'd that it may be proper for him to

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plant the Ash on any Soil, and in any Situation, but that he must make a right Use of it when planted. The Ash on barren hilly Places, will grow to a very good Coppice Wood; but 'tis not a fit Soil for planting it for large Growth. And in the most stony Ground, the Ash may be planted for Pollard, and will yield a good Quantity of Wood in Shrowdings, as well as maintain a firm Trunk to the Height, that is allow'd on those Occasions: but it is only in the richer Soils, and in more favourable Situations, that it will grow speedily and profitably for Service as Timber.

One Kind of Soil has often been remark'd as favourable to the Growth of the Ash, which it is a Wonder the Husbandman has not more observ'd, or oftener planted with it, this is the white chalky Soil: many Trees that flourish very well on others, will grow but poorly on this; whereas the Ash, whenever it is seen on such a Soil, has a healthy Aspect; and Experience shews those who are concern'd, that it arrives very quick at a valuable Size.

We have advis'd the Husbandman before, always to look into the Hedge Rows of his Neighbours, before he plants Trees in his own, that he may see what Kinds thrive best there, and suit his own Plantation accordingly. As plain and obvious a Thought as this may be, it is not follow'd. The Work is done at random, and succeeds accordingly.

The Husbandman in KENT and SUSSEX, tho' he sees the Ashes in his Neighbours Hedge Rows fair and thriving; and the Elms in the same Plantations, crooked, stubbed and hollow; yet when he makes his own Hedge, sets Elms, and they grow hollow and stubbed like the others, neglecting the Tree that he sees thrive so admirably.

Custom has been used to guide the Husbandman in ENGLAND, without his ever consulting his Reason, or even Experience. We hope that one good Effect of this Book will be the leading him to use both in a proper Manner; and that seeing how necessary such a Conduct is, and how useful, he will for the future try Custom always at their Tribunal, and accept, or reject it, according to their Sentence.

There is one Caution the Husbandman is always to take with him in the planting the Ash; that is, that too many of them must not be planted in the Hedge Rows of plow'd Lands. The Ash spreads its Roots a great Way, and, if not prevented, its Branches also. When this latter is the Case, the Drippings from them hurt the Corn, and when the pruning prevents this, still the Roots spreading so near the Top of the Ground, take the Nourishment that should support the Corn: and another Inconvenience arising from them is, that they obstruct the Tillage of the Ground by their Frequency and Toughness.

From these general Observations on the Ash, the Husbandman will know where, and in what Manner to plant it in his Grounds; and, when planted, how to manage it to the best Advantage.

If he plant it on a bad Soil, and in an exposed Situation, let him use it as Coppice Wood,



covering the Ground either with Ash alone, or with that and some other hardy Kinds, and cutting them down at twelve or fourteen Years Growth, and afterwards every seven or eight Years; if he plant the Ash on a hungry stony Soil, let him shrowd it at the Height of ten Foot, and keep it as a Pollard. When he has Hedge Rows on good light Land, separating Meadow and Pasture Grounds, let him set Ash plentifully in them; and never let him forget it when the Soil is chalky.

The Ash does not like the Elm thrive only when it is open every Way to the Air, it is a very good Tree in Woods; and indeed so profitable, that they should in very few Cases be planted, without a large Proportion of this Kind; for it grows no where quicker than among Trees every Way, if the Soil suit.

The Soil that agrees worst of all with the Ash, is a wet Clay: not but this Tree will bear a great deal of Moisture, where there is not that Coldness and Solidity in the Ground; for we see it growing at some small Distance from Rivers in many Parts of BUCKINGHAMSHIRE, and it thrives no where so happily. The Timber when felled, is whiter when it has grown in these Places than in any others, but it must be confessed, it has not altogether that Strength it possesses in drier Soils.

The Ash is an Enemy to all smaller Growths: and no Tree drains a Land so much of its Nourishment. If planted too near Gardens, it will starve the Fruit Trees, and hurt every Thing that is propagated within the Reach of the spreading of its Roots; and much more whatsoever is within the Drippings of its Branches.

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### C H A P. XXIII.

#### *Of the Propagation of the Ash.*

**T**HE Ash is best propagated by sowing the Seeds; and this may be done either in the Places where the Trees are to stand, or in a Nursery from whence they are at a proper Growth to be removed into those Places. The common Custom of Writers is to give one or the other of these Methods as the best, without any Exception; but we hope to introduce a more reasonable Practice. It may be most convenient to raise the young Trees in a Nursery for some Purposes; and for others it will be found best to sow them where they are to stand. Let the Husbandman therefore conduct himself, not according to any general Direction, but according to the Situation and Design of his Plantation.

Let him consider whether he intend to raise his Ash in Hedge Rows, in Coppices, or Woods, or in Clumps upon exposed Situations, as in Parks, or on the naked Hills where little else of Value will stand: for, according to these several Conditions, the Practice he is most advantageously to follow, will differ.

If his Ashes be for Hedge Rows, it is best to raise them in the Nursery, and to remove them thither by two Transplantations: if for Clumps,

or for Coppice Woods, 'tis best to sow them on the Spot; but when they are to make a Part of large Woods, the Soil and Situation must determine, for on a very good Soil they do best by Transplantation; but it is best raising them immediately from Seeds, where the Land is barren, and will not yield them a speedy Nourishment when transplanted.

The Ash may be raised as the Elm by Layers, but it does not succeed so well: and the Husbandman may purchase the young Shoots, or Suckers, from those who draw them in the Hedges, but they never rise to be such fine Trees, nor grow so quick; this Experience abundantly confirms, and therefore it is that the Method of raising them always from Seed is to be prefer'd; though with this Difference, that sometimes 'tis best to do it on the Spot, sometimes in the Nursery.

Which ever of these Methods the Circumstances of the intended Plantation require, the first Care is to get a necessary Quantity of good Seed. Let the Husbandman not buy this, for if he does, he is never sure of its Goodness; and 'tis easily in his Power to collect it under all possible Advantages. Let him set his Eye upon a tall, lively and flourishing Tree, and watch the ripening of its Keys. When they are thoroughly ripe, let him send up a Servant to shake the Tree well; and if they don't fall readily this Way, as in some Seasons they will, and in others they will not, let him see a Quantity of the Bunches cut off, selecting the fullest, best and largest.

The Seeds being thus got, let them be sown according to the Intent of the Plantation.

If the Trees be intended for Hedge Rows, or for Woods, upon a very favourable Soil, they are to be sown in a Nursery; but if for Coppices, in Clumps; for Parks or in Woods, on poor Ground, then on the Places where they are to stand.

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### C H A P. XXIV.

#### *Of raising Ash in a Nursery.*

**T**HE last Week in OCTOBER, which is the Time of the Ash Keys ripening, let a small Bed of Earth be well dug, and perfectly cleansed from all Sorts of Weeds. 'Tis best to chuse for this Purpose a Piece of Ground that has not been wrought before. The Soil should be light but poor, an ordinary Loam where there is Choice, is preferable to any other: but this is not strictly necessary.

When this Earth is well prepared by turning and breaking the Clods, let the Ash Keys be spread for a few Days after their Gathering, upon a Floor of some airy Room, where the Sun does not come; and being thus a little dry'd, let them be sown thick in shallow Trenches open'd a-cross the Bed, at four Inches Distance. Let the Earth be drawn over them with a Rake, and the Bed made perfectly level; and so leave them to the Course, of Nature. Nothing will be seen of them till about seventeen Months after; and they will then rise in vast Plenty along the Places where the Trenches run.

During



During the Time the Seeds lie in the Ground, as well as after they are up, the Bed must be kept very free from Weeds; and in the Spring, if there are not frequent Showers the Plants should have a little watering. Sometimes, if the Keys be gathered very ripe, the Ground fresh and good, and the Season particularly favourable, the Ash Keys will rise the first Spring: but they usually lie till the second, and we have therefore prepared the Husbandman to expect it.

The Authors on these Subjects who are as ready to abuse, as they are to borrow, from one another, insult each other upon the supposed Errors about the Time of the shooting of Ash Keys; but we are to inform them from Experience, that the Truth may lie on either Side, and those who may write from what they have seen who contradict one another; for that it is sometimes the first, and sometimes the second Spring they shoot, but much oftener the latter.

A Nursery must be early prepared to receive the young Trees from this Bed, for the Ash bears, and requires transplanting from the first Shoot, earlier than any other Tree whatsoever.

I have always found it most beneficial to remove them out of the Seed Beds at six Months Growth, one Summer being enough for their shooting; and their Roots piercing too quick for deferring it.

Therefore let a larger Piece of Ground be well dug, and clear'd of Weeds, for the Reception of these young Trees, the Autumn after their first Appearance above Ground. Let Trenches be open'd all over this Ground, at three Foot Distance, and let them be deep and wide enough to receive the young Trees, without Injury to their Roots when prepared for them.

The Ground being thus prepared let the young Trees be taken up: but this requires more Care in the Ash than in many other Kinds; for the same Reason that this requires to be transplanted younger than the others. The Roots must be a little loosen'd with a Spade, and then carefully rais'd without breaking. The tap Root, or strait Root that runs down, must be cut off at a few Inches Length; the Rest must be left as they are: and the young Trees in this Manner must be carefully set in the Trenches, at about fifteen Inches Distance from one another; and the Earth closed and press'd down about them.

They are to stand in this Nursery four Years, and then to be removed into the Places where they are to remain: but in order to their growing regularly, some Care is to be taken of them while they are in this Nursery. Weeds must be kept thoroughly away, that they may have all the Nourishment the Earth can give them; and they must be trim'd up every Winter, cutting off the Side Branches.

It will greatly assist their Growth if the Earth between the Rows be dug up every Spring: and at their first bringing into this Nursery a little Care may be well employed, in seeing that they keep upright, and that the Earth be well clos'd about them, which is best done by treading it down. Late in the Autumn of their fourth Year, in this second Nursery, they are to be removed into the Hedge Rows where they are to stand; or to be brought into the new Plantations of Forests,

where a good Hole is to be opened to receive them, and Care taken to set them upright and keep them so.

The Distance for planting them in Hedge Rows, is about five and twenty Foot. In Woods intended for long standing, and a good Growth of Timber, an Ash may very well and very profitably be planted, every third Tree; and in this Case, about nine Foot every Way is a proper Distance.

If Ash would be rais'd alone, as it may in many Places, with great Benefit to the Owner; the best Method is to plant them at eight Foot distance every Way in the Place, and at the End of the first Year, going over the Plantation to cut down every other Tree at six Inches from the Root: chusing the worst Shoots for this Purpose, and leaving the straightest and best standing.

This thins the Plantation for the present to one half, and gives it a double Kind of Growth. These Stems which have thus been cut off, will send up many strong Shoots, which will grow into good Poles in five or six Years, fit for the Hoop-makers and many other Uses; and they will thus, at proper Times, yield a Supply of small Ash in the Manner of a Coppice, very useful for this Purpose; and all the while the others which were left standing, will be shooting up into beautiful and stately Trees, which in thirty, forty, or fifty Years, according to the Nature of the Soil, will be of great Value.

The Soil also must determine whether the whole Number left at this first Reduction shall stand for Timber, or whether they require to be thin'd again; if so, let this be done with Discretion; and always the worst taken for cutting down for small Wood, and the tallest and straightest left for Timber.

When the Ash is removed into the Place where it is to stand, some of the side Branches may be taken off, but the Top is never to be cut. If that be to be done at all they must be cut down to the Ground, and stand for a Supply of Poles, or at a greater Height for Pollards. For if the Top be once injured, they never make Timber.

There is this Advantage in the Ash, that where it will not do for one thing, it will for another; and at any Time, when it is seen that a Tree will not thrive for Timber, it may be cut off at six or eight Inches, and will then succeed very well. This may be done at any Time, and the most sickly Ash will revive upon it.

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#### C H A P. XXV.

##### *Of raising Ash where it is to stand.*

**T**HERE remain yet some other Plantations of the Ash to be considered, these are, first, when it is to be a Part of Coppice Woods. Second, when it is to be rais'd in Woods on a poor Soil, either entirely of that Kind, or of that mixed with other Trees; and, thirdly, when it is to stand in Clumps in Parks, or singly upon high and barren Grounds. In all these Cases the best Method is to raise it where it is to stand, but there is a different Way of doing this, in order



order to suit it best to the several Circumstances. We shall therefore give the Directions singly.

When the Ash is to make a Part of Coppice Woods, there should always be a double Intent in the Plantation, some of the Shoots being to be cut for Poles among the other Coppice Shrubs at the several Fellings, and some to be left to stand for Timber.

The Ash may be let into these Coppices either at their first Plantation, or after any of the Fellings; and the Method is this.

When the Growth of the other Shrubs is at some Height, whether from the first Shoot, or any subsequent Felling, let the Husbandman go over them with a Trowel in his Hand, and some choice Ash Keys in his Pocket; the Season for doing this must be the End of OCTOBER, and the Keys just gathered, and a little dry'd, as has been already directed for preparing them for the Nursery. He is to open the Ground with his Trowel, in convenient Places, and let in a few of the Keys. There he is to cover with the Earth taken up, to about half an Inch depth, and then to draw the fallen Leaves over the Place by way of Shelter, and to detain the Moisture. The Places where he is to introduce these is where there is most Vacancy, and where the Soil is finest, and there is most Moisture if the Situation in general be dry.

These will shoot very favourably, and the Autumn or Autumn Twelvemonth following, according as they have shot the first or second Spring, he is to go over the whole Coppice and examine his young Plants, cutting off those which rise crooked, within five Inches of the Ground, and leaving the others for Timber Trees.

Thus will he thicken his Coppice in a very easy Manner, and that with one of the most valuable Trees he can plant in it. Those Ashes he has cut off will rise in Clusters of Poles, to be cut down with the rest of the Coppice Wood at every felling: the others will grow well, and are to be left standing in sufficient Number for Timber. When they grow too close the Woodman must cut down some of them, at the first Felling of the Coppice, leaving the Stumps to supply the small Growth of Poles for that Purpose, in the future Cuttings; and the other Trees to grow up for Timber.

As this is a particular Practice in introducing the Ash into Coppices, 'tis fit the Husbandman should know the Reason of it.

If the Coppice have been rais'd by planting from the Nursery, the Ash will not grow well in it, unless the Soil be particularly good. Then as the Ash requires a Time of transplanting from its first Beds, different from other Trees, being much earlier, it is best to raise the Supply of those several Kinds without it.

'Tis also a quicker Grower than the Generality of other Coppice Trees; insomuch that if it be brought into the Plantation long after the others, it will rise to an equal Bigness with them by the Time of felling; for the common Growth of a Coppice is from twelve to twenty Years the first Time; and these Ashes will rise to very good and useful Poles in seven Years after the cutting the Shoots down to the Ground.

When the Coppices are rais'd by sowing, the

Ash Keys may be sown with the other Seeds, and take their Chance: thus will they only outgrow many of the other Kinds; and there is no great Harm in that; but this Way of introducing them afterwards, is preferable for many Reasons. It places them not at Random, that they must stand when rais'd with the rest of the Coppice Wood, but just in those Places where they will thrive best; and the Advantage before-named, of thickening the Coppice with so useful a Growth and in so easy a Manner, is far from trivial.

There remain two other Occasions in which the Ash is best propagated immediately from the Seed in the Places where it is to stand, that is, in the Woods designed for Timber on a poor Ground, and in Parks, and other exposed Situations. In Woods, when the Soil is good, the Ash may be brought in at four Years Growth very properly, and will thrive very well, because as much as it is stop'd by the last Removal, so much, or more, it will be assisted by the superior Goodness of the Soil. But when that is indifferent; and perhaps worse than the Ground of the Nursery, it is best to sow the Seeds there; for no Trees succeed well on being transplanted, unless it is on a better Ground.

As to those Ashes which are to stand singly, or in Clumps in Parks, or other exposed Situations, they are best raised from the Seed there, for the same Reason; the Exposure otherwise checking them, if brought from a Place where they were sheltered, as Nurseries usually are, as much as the barren Soil.

In either of these Cases the Method to be observed is this. Let the Ground be opened in every Place where an Ash is intended to be rais'd, to the Depth of two Feet, and very well turn'd, and the Clods broken. When the Ground is thus prepared, let about a Dozen Ash Keys, of the soundest and best Kind, be set in each Place, and defended till they come up by Bushes laid over, or a low dead Hedge carried round the Spot. When they have shot let half of them be pull'd up, leaving the most promising; and after this, at different Times, let all the others be taken up, except one, leaving the finest and most regular.

This must be carefully done every Time, that the Roots of the remaining Tree may not be disturb'd. It is then to be defended by Pales, or otherwise, and carefully trim'd up in the Winter, to take off all straggling Branches, and carry it up strait and regular. There is no doubt of thus raising fair and rich Trees.

The more common Practice for raising an Ash Wood, is to plow the Ground intended for that Purpose, and sow the Keys upon it, thinning them after they are of some small Height; or others sow Oats with the Keys, and gathering that Crop at a proper Season, leave the Keys to shoot at their Leisure, under the Shade and Defence of the Stubble.

We have mentioned this Method of sowing already, for the raising of a Coppice; but for an Ash Forest design'd for the Timber, this Method is not comparable to the before-mentioned, which very well pays the additional Labour by the better Growth of the Trees.



At all Adventures, the raising such Ashes as are designed for Timber upon the Places where they are to stand, is, in these Cases, vastly preferable. We desire Timber Trees should be of an even and uniform Growth; and such they are if rais'd from Seed in their Places, because they meet with no Stop; the Nourishment yielded by the Ground, be that more or less, being regularly conveyed to them: whereas all Trees have some Stop at the Time of transplanting, before their Roots have laid hold thoroughly of the new Earth; and none so much as the Ash. It is allowed by all who are concern'd in these Transplantations, that the Ash, for the first Year after its second Removal, makes very little Progress in its Growth; which shews the Disadvantage that arises from the Removal; and how much better it is that the Trees of this Kind, design'd for Timber, should be sown in the Places where they are to remain, that they may have no Check in their Growth.



### CHAP. XXVI.

#### *Of the lopping and felling the Ash.*

WE have considered the Ash as a Coppice Tree, a Pollard, a Hedge Row, and Forest Tree, in the raising; and it must be regarded in all these Lights also to the End: for it is frequently used in all the four Kinds, and a Method not altogether the same is to be followed in treating it under these several Forms. In Coppices it is to be cut with the other Wood, when rais'd in Poles by cutting off the Shoot while young; but when it stands for Timber among these Plantations, Care must be taken it does not spread out too much into Head, for the Drippings from that Breadth of Top would do a great deal of Harm to the young Growth after every felling.

When the Ash is cut as a Pollard Care must be taken to keep all its Boughs at such a Height, that they be out of the Reach of Cattle; and the Husbandman must consider the Ash is a Tree of quicker Growth than most others, and cut off the Shrowds accordingly, oftener than he would from most other Kinds. In these Pollards he is also to observe carefully the State of the Trunk. It grows hollow sooner than many other Kinds, and then it loses its Value, and yields fewer and fewer Branches for lopping every Time, and they grow more slowly. I therefore advise the Husbandman to keep up a Stock of these, by now and then planting fresh ones for this Purpose, and cutting them off at a proper Height. And these being thus ready to take the Places of the old Set, let him cut down these as soon as they begin to be hollow at the Top, anticipating their Decay. Thus he will have the Benefit of their Branches, for which these Pollards are principally rais'd, as long as the Tree bears them in Quantity, and with Vigour, by cutting up the Tree when it begins to shew the first Signs of Decay, he will have the Advantage of so much good Timber as the Tree affords; and he will have fresh and vigorous ones ready in the Places of those he destroys. These young

Trees should be planted evenly, one between every two of the old ones; and the Roots of the old ones should be grub'd up, that the young may have full Liberty for spreading theirs: and thus it will be proper to go on from Generation to Generation, always preparing a Supply in Time.

When the Ash grows in Hedges it must be lop'd carefully, and often: neither the Loppings here, nor in the Pollard Ash, should be suffer'd to grow too large; and the best Season for cutting off both is in Spring. It must be prevented from having too large an Head in Hedges, as in Coppices, and for the same Reason to prevent the Mischief arising from its Drippings, and it will thus rise into a noble and regular Tree.

In Woods and Parks proper Care must be taken in forming and training the Ash at first, but afterwards it requires no lopping. It must be carried up in a strait and uniform Trunk in Woods: but in Forests it may be suffer'd to branch out after a certain Height, as from twenty Foot or thereabouts. This takes off something from the Value of the Timber, because of breaking in upon the Length; but it gives the Tree a finer Top, and a more beautiful Aspect, which is a Thing regarded in those Plantations; and the Quantity of the Timber is not lessened, though the Value is in some Degree abated, for these large Arms yield a great deal.

The Time of felling the Ash is the Depth of Winter, when the Sap is altogether at rest; for when cut down at any other Time, it becomes subject to Worm-eating, and loses a great Part of its Value. It is to be fell'd in NOVEMBER, DECEMBER, and JANUARY; but best of all about CHRISTMAS Time. And in felling the Workmen must take Care to cut it off as close to the Ground as possible; and if it be one that has grown in a Park, or elsewhere, when the Head has been indulg'd, the larger Boughs must be carefully cut off while it is standing, or a great deal of the Timber will be spoil'd in the Fall. The best Time of all for cutting small Ash, in whatever Form, is toward the Middle of FEBRUARY.



### CHAP. XXVII.

#### *Of the Uses of the Ash, and its Value in Plantations.*

THE Growth of the Ash, which is quick and regular, recommends it in Plantations about Houses and Gardens; keeping a due Distance between these Trees and the Garden Ground; and the Make of its Leaves so different from that of the other common Kinds in these Plantations, gives a great and a very pleasing Variety. Those who are curious in Trees should always raise Ash also in their Nurseries for another Use, that is, to bud upon it the several foreign Kinds mentioned in the first Chapter on this Subject, all those succeeding better here upon that Stock, than when rais'd without budding.

No Wood is so sweet in the Bud as the Ash, and for that Reason there is none on which Cat-



tle so much love to browse. It is to be defended from them in young Plantations, for this Reason, with great Care, but it may be made useful in a proper Manner, like the Elm, for the same Purposes. The Cuttings of the Ash feed Deer in hard Winters, and are acceptable to any Cattle. Cows and Oxen, when they are suffered to feed upon the fallen Hedge, always devour the Ash Shoots before they touch any other; and when any other Kind is offer'd to the Deer along with it, they always give the Ash the same Preference.

The Ash is very valuable for Fire-wood. No Kind whatever burns so free or so sweet; and in case the Farmer have not a Stock before-hand, none answers his Purpose like the Ash, for it will burn when fresh cut better than any other Kind whatsoever. This Freedom of burning green, and the Fondness of the Cattle for the Ash Tops, are both owing to the same Cause. There is a sweet and sugary Juice with which the Ash abounds, which is pleasant to the Taste, and is very inflammable; these Kinds of Juices, as may be seen in common Sugar, burning very violently.

The Timber of the Ash is sound and of great Strength, and is sold at a large Price for many Kinds of Works. It is used greatly in building: And by the Coach-makers and Cart-makers. It will remain sound a vast while when it can be kept dry, but it does not bear Wet like some other Kinds. There is a great deal of Difference in the Ash, according to its Growth. The Ground Ash is very strong, and valued for many Purposes, although small. A Bough of it exceeds any other, except the Oak, in Strength, Toughness, and Lasting. But there is, as in other Woods, a great deal of Difference between the Ground Ash and the quartered Timber.

The Carpenter and Plow-maker in the Country use a great deal of Ash, and the Wheelwright finds no Wood comparable with it for his Purpose. The Harrow, and most of the Instruments in Husbandry, are made of it. It serves excellently for Hoops, and other Parts of the Cooper's Business, and for the Turner; and some of it is so finely vein'd that it is used by the Cabinet-makers, and is called green Ebony. Poles of all Kinds are cut out of the Coppice from the Ash Stumps. None are equal to them for the Hop Garden; and they are cut out for Palisade Hedges, and a Multitude of other the like Works. Axles for Wheel Carriages are almost universally made of Ash, and Blocks for Pullies, Oars, and Handles for Tools.

Upon the whole, as scarce any Timber is of quicker Growth than the Ash, none is of quicker Sale, for every Bit of it will go to Market, from the main Trunk used for large Works, to the smallest Pole, or the least Piece of the quartered Timber. For these Reasons nothing can be more advantageous for the Husbandman, where there is a convenient Piece of Ground, than the raising a Wood of Ash alone. We have shewn the Method of doing this already, by sowing a proper Quantity of the Keys, and cutting off the least promising Shoots while young, leaving the strait and fine at proper Distances for Timber. In this Management there is an annual Income from

the Plantation, all the while the Trees are getting their due Bigness for Timber. The Underwood from those Shoots which were cut off, because uneven, may be cut every six or seven Years; and in a large Plantation a sixth or seventh Part every Year, which will be of ready and good Sale for Hop Poles, Garden Poles, and the like Things. Wood for all these Purposes is had from these Stumps, each of which, as soon as cut down in the Manner already directed, sends up a Number of Shoots, that in this Time arrive at a Growth sufficient for all those Uses; and are, after that, to be cut once in six or seven Years, with the same or greater Advantage during all the Time the Timber Trees are growing, which may be from thirty-five to fifty; or five and fifty Years, according to the Nature of the Soil, the Situation, and other Advantages or Disadvantages to the Growth.

XX

## CHAP. XXVIII.

### *Of the Beech, its best Soil and Situation.*

THE Beech is a tall, stout, and well-growing Timber Tree. The Leaves are broad and short. The Flowers are small and inconsiderable, these stand together in little Branches. The Fruit grows on other Parts of the same Tree, and consists of two Nuts enclosed in a rough hairy Case. These Nuts are the Seeds of the Beech: they are of a triangular Figure; and their hairy Case is divided into four Parts. These Fruits, all together, are what the common People call the Beech Mast.

The Gardiners and Nursery-men keep what they call the Silver Beech and Gold Beech, and the Planters of most Curiosity tell us of the Mountain Beech, and the wild Beech: this would lead an unwary Person to believe, that there were three or four different Kinds or Species of Beech, as there are of Elm, but it is not so. As to the Nursery-men's Trees they are only the common Beech, with its Leaves variegated with white or yellow, like the other of their Curiosities in that Kind; and as to the Mountain Beech and wild Beech, they are the same Tree; and the Difference the Planters speak of, in the Colour and Firmness of the Timber, is owing to the Soil and Situation, not to any thing in the Species of the Tree, for the same Seeds will in different Soils raise both Sorts.

The natural Soils of the Beech is a dry, light, and warm Land, Richness of Earth it does not at all require, which is a Thing of great Advantage to the Planter, if he would sufficiently regard the suiting his Trees to his Land. Beech will thrive on the driest and most sandy Soil; or among raw Gravel or Stones, nay almost upon Rocks. In many Places where one sees Beeches of a vast Growth, one is, at first Sight, astonished to conceive whence they have their Nourishment; but upon examining their Roots the Wonder ceases, for they are found to penetrate to a great Depth, and to spread a vast Way when arrived at Places where there is Moisture and Nourishment; as many other Trees Roots do, at all



low and wet; if the Beech were universal in the one, and deficient in the other, it would seem reasonable, but there are no such Grounds for the Want of this Tree in many Places.

There are many Counties as generally fit for it as those where it is most plentiful, where yet a Tree of it is never seen: and many thousand Acres of Land in this Kingdom on stony and chalky Hills, are left usefess, where the Beech would prosper and yield an incredible Profit.

We hope by these our Labours to make the Benefits of some Parts of the Island reach others where they are not known at present; and there is none in regard of which this may better be done than the Beech Plantation.

**தந்தை தாயே நான் உங்களை நினைத்துக் கொண்டிருக்கிறேன்**

*Of the Propagation of the Beech.*

Those who plant Suckers, commonly buy them from the common People who draw them together with the Elm, Ash, and other Kinds for Sale: but as these People take them up carelessly, and at random, good and bad together, I advise the Husbandman who intends to spare himself the Trouble of a Nursery, at least to draw the Suckers for himself, that he may chuse good Plants, and have a good Root.

When he has got a sufficient Number of these, let him plant them at once where they are to stand, and take Care to open a good Hole in the Ground to receive them, that the Roots may not be injur'd; and to set them secure and steady, supporting them by Stakes as they first grow up. If he will take this Care, he need not be uneasy at their growing slow for the first two or three Years, or even at their rising knotty and crooked, for they will out-grow all this: they will afterwards shoot apace, and become strait and fine Trees.

This may do well for the raising a few Trees, but when a Forest of Beech is proposed, or a large Quantity in Parks, for which they are very fit, the Way is to raise them from Seed.

There are two Methods of raising Timber Trees from Seed, as before observ'd, the one by sowing them in a Nursery, the other by laying in the Seed at once, where the Trees are to stand. We have recommended the raising the Oak in its Place, because of the strait Growth, and the Ash, because its long Root renders it less fit than many other Kinds for removing:

Now,

These People contradict Nature, and then wonder they have not Success: they will not be advised how to succeed, and when they fail by their own Obstinacy and Ignorance, they cry out, Who would plant; when, beside the Length of Time, the Success is so uncertain. Let the Person who is about to enter on this Business, but take his Directions from Experience, or from the collected Maxims of it in this Work, and no Practice whatsoever in the Compass of Husbandry is so sure of Success.

The Plenty of Beech in many Parts of ENGLAND, where there are vast Tracts of Land cover'd with Woods of it, has led some to censure CÆSAR, who says, There was no Beech in BRITAIN. But 'tis possible the ROMANS might be right; the Elm, as common as it is at present, is suspected, with Reason, not to be a natural Product of our Island. There might therefore be a Time when there were no Elms in ENGLAND; and yet, from the Face of Things at present, it would appear much more improbable to say this of the Elm than of the Beech.

To prevent Mistakes with Respect to the most antient Accounts in which this Tree is supposed to be named, it is proper to observe, that what is understood to be the Name of the Beech in many of the old GREEK Authors, is really used by them to express the Oak, as appears from their accidental mention of the Fruit.

The Beech is at present confin'd as it were, to some Counties of ENGLAND, being altogether unknown in others. Nature has indeed fitted this Tree to some particular Soils and Exposures, and as we have some Counties mostly hilly and dry, and others, for the greater Part,



now; though the Beech is liable to neither of these Objections as to transplanting, because it will very well bear a Removal while young; and will out-grow a Defect in Shape better than any other Tree, yet there is another very substantial Reason for raising it where it is to stand; which is the Poorness of its Soil. It is a general Rule that Trees must be rais'd on a poorer Ground in the Nursery, than that where they are design'd to grow; but the proper Soil for the Beech is so poor, that the Nursery cannot well be made in a poorer: and it is certain, that a Tree never does well on transplanting, unless it be removed into a better Soil.

For the Sake of those who will follow their own Method in all Things, we shall, however, lay down the best Way of managing it in this Manner.

For the Nursery Way, let a small Bed be dug in a poor, raw, gravelly or stony Soil, and some good Beech mast be gather'd from a thriving Tree, and sown in it in Trenches three Inches deep, drawing the Earth over it with a Rake. When the Bed is thus prepared and sowed, it is to be kept clear from Weeds; and when the Plants rise, they are to be watch'd, and in the first Autumn after their shooting, some of them, where they grow thickest, are to be removed into a larger Piece of the same Ground: the next Autumn, a second Parcel are to be drawn out of the Seed Bed; and a third Parcel, the Autumn afterwards; then leaving only a few at proper Distances, as the others are placed in the new Ground.

Upon the Removal they are to be set in Rows a Foot and half distant one from another, and the Rows a Yard distant; and they are to be kept there three or four Years, digging between the Rows in Spring, and keeping clear of Weeds.

This is the Method where a Nursery is used; but I think the sowing upon the Spot preferable; and in this some Difference is to be observ'd according to the Nature of the Plantation. If a large Tract of Ground is intended to be cover'd with a Beech Forest, the Plow is to be used; but if some Clumps of them are to be raised in Parks, or other Plantations, the Spade is preferable.

When these large Plantations are intended, or where the Trees are to be raised for Beauty, a particular Care is to be taken in the Choice of the Seed. The mast is to be gather'd from the tallest and most beautiful Trees, and to be sown as soon as it has been a little dry'd, by spreading on the Floor of an airy Garret, not exposed to the Sun.

For the sowing a Forest, let the Ground be twice plow'd, and well harrow'd to break the Lumps; and let the Seeds be carefully scatter'd, and well cover'd. After this when they rise, let the Weeds be kept under, and from time to time let the Growth be thinned till the young Trees are left standing only at nine Foot Distance every Way.

After this let the Planter go through them every Winter, and carefully trim them up for Timber Trees, taking off such side Branches as would draw the Nourishment from the Trunk;

and when he has thus set Nature into a right Course, let him leave her to herself for the Success.

In Parks, and other Plantations, where Beauty is consider'd as well as Use, the Spade is to be employ'd instead of the Plow, because the Ground is to be open'd for the Seeds only in a few Places, and the Seeds must be more carefully set and cover'd.

For this Purpose the Beech should be allowed five and thirty Foot Distance every Way between Tree and Tree. It will in the Growth very well fill up this Space, spreading into a noble Tree, and making an elegant Appearance when full of Leaves; as they are very numerous and shining.

At every thirty five Foot let a Hole be open'd, and the Earth being well stirred, let five or six Seeds be set in it at three Inches depth, and at equal Distance from one another.

Beech Seeds are very apt to be eaten by Vermin, and the Hope of a whole Plantation may be so destroy'd, but if they are carefully cover'd at this Depth, they are secure.

When they shoot up, the weakest are one after another to be drawn, and at last one Plant only is to be left in each Hole; which is to be defended, as has been already directed for the Oak, and will not fail to grow up into a noble Tree.

It very seldom happens that any of such a Plantation die; but to provide a supply for such a possible Accident, let some of the best of the young Shoots that are drawn, be set out in a Nursery Bed, where being of an equal Age, they will be ready to supply a Failure in the Plantation.

These Beeches are to be trim'd up as they grow, but at five and twenty Foot they should be suffer'd to send out two or three large Branches, for this makes the Beauty of a Tree for a Park.

At this Distance they will not in the least interfere with one another, and if the Soil and Situation favour them, they will grow to a surprising Height and Bigness.

In many Places the Beech may be planted in Hedges very profitably; and, as to the Difference of the two Kinds, the Mountain Beech, and the wild Beech, the Planter will be able to raise both out of the same Parcel of Seed, only by sowing them in a different Soil and Situation. Those which he raises on dry hilly Places, will be Mountain Beech; and the Timber will be white and even grain'd. Those which he raises in lower Grounds, and Hedge Rows, will be wild Beeches; and the Timber will be darker in Colour, and though of a more uneven Grain, it will be of a firmer Substance, and more durable.

As to the Lopping of this Tree, it requires less than most others, for the greatest Care is in the pruning it while young. When this is carefully done, and the Tree train'd to a proper Growth, it produces few side Shoots when in Woods; and in Parks it only spreads at the Head, as design'd. When planted in Hedges, it is to be treated as the Ash, and other Hedge Row Trees; and when cut for a Pollard, which it may very well be, it is to be shrowded once in about eight Years,



Years, and that always in Spring. For if the Shrowding be suffer'd to grow too large, or be cut off in Winter, the Wet will get in and damage the Trunk, which is very apt in this Tree to grow hollow from such Injuries.

It is to be felled any Time from the Beginning of the Month of NOVEMBER, to the End of FEBRUARY, but the Timber keeps best when it is cut in the Depth of Winter.



C H A P. XXX.

*Of the Uses and Value of the Beech.*

THE Beech, when we consider at large its Uses and Value, is not to be look'd upon only as a Forest Tree, but as one for the Garden. Its Beauty in Parks we have mention'd already, in which Respect no Tree whatsoever exceeds it.

In Gardening few Kinds are so proper for the making large Hedges to surround considerable Plantations, or large Wilderness Quarters. In this Condition they may, with due Care, be kept very regular, and will be as beautiful as they are useful: but the Gardener is to know that this is a very quick shooting Tree, and that its young Branches soon get Strength: for this Reason he must be sure to cut his Beech Hedges twice a Year; for when they are let alone but a little while, he will find it extremely difficult to get them again into Order.

There is another Reason also why the Gardener should raise a Stock of Beech Plants in his Nursery. They are very useful for receiving the strip'd Beech of both Kinds, by budding or grafting; and it is found to thrive better upon the wild Beech Stock, than when raised on its own. This indeed is true of most of the strip'd Trees.

We have not recommended the Beech Tree in Coppices, because if suffer'd to stand for Timber, the Drippings of the Leaves will greatly prejudice the young Growths after felling the Coppice: and for the same Reason those who shall have a proper Soil for raising it in Hedge Rows, though they may do this to a considerable Profit, yet must take Care to lop it in such a Manner, as to prevent the Damage it may otherwise do by its Shade, and the Drippings from its Leaves.

It is on the Sides of Hills that the Beech flourishes best, and yields the finest Timber: it will here stand against the strongest Winds, better than almost any other Tree, altho' the Ground seem ever so loose; but this is owing to its deep rooting, and to the Roots spreading so greatly at that Depth.

Let not any one be disheartened if he see his Beech Plantation grow slowly, for in moist Soils 'tis the Nature of the Tree to do so at first. When it has been thus for two, three, or four Years spreading in Root rather than Top, it will begin of itself to thrive, and will go on without Stop or Interruption till it be arrived at its full Maturity, in which it exceeds most other Trees in Size.

The Fruit of this Tree called the Beech Mast, N<sup>o</sup> 14.

is a most excellent Food for Hogs, and many other Creatures. Deer are very fond of it; as also Pheasants, and many Kinds of Poultry. It fattens these Creatures excellently, and their Flesh is never better tasted. The Leaves of the Beech are light and dry, when properly cured, beyond all others. It has been a Practice to stuff Mattraffes with them. There is also another Use to which the Fruit of the Beech may be put, that is, the pressing it for Oil; this it yields in such Quantity, that a Bushel affords a Gallon, and it is so sweet and well flavour'd, when drawn with proper Care, that it may be eaten as Oil of Olives; and will serve excellently for several Purposes for which Oil of a large Price is used.

There was some Years ago an Undertaking set on Foot for the making this Oil, but it was ill contrived and very injudiciously executed, so that 'tis no wonder it fail'd: but that is no Argument against the setting about it again upon better Principles; and with wiser Management. There is no Doubt to be made of its Success for the Quantity and Quality of the Oil ensures it.

Those who should entertain Thoughts of such an Undertaking, are not to be discouraged at the small Quantity of Mast they will some Years see on the Trees. The Beech does not bear regularly; but in general about one Year in three is a good one; and the Produce then is prodigious.

Those who are curious in observing the Growth and Success of Fruits, have often express'd their Surprise at the great Difference there is found in the Quantity on the same Tree in different Years; and the more so as after keeping a strict Watch of the Season in that whole Year, they have frequently found nothing particular to occasion it.

Several ingenious Persons have mention'd this to me; and I shall take this Opportunity of proposing my Opinions concerning the Cause, as there is no Kind so much liable to this Uncertainty of bearing as the Beech. The same Tree in my Neighbourhood having to my Knowledge yielded some Years not above six or eight Bushels of Mast; and some others fifty.

They who enquire so far into the Cause of this, as to examine the Seasons of that Year, should go a little farther back, and take Notice of those in the preceding. It is certain that the Weather of one Year will shew its Effects in the Fruits of another; especially in Trees that grow on loose and open Soils, and this in the common Course of Things is in no respect more the Case than in the Beech.

When one Year has been remarkably wet, it has been found to affect the Fruit of that which follows; and particularly such as is produced by Trees that grow on loose and open Ground: I shall mention, by way of Instance, the Vine. When one Year has been very wet, if the Vines be examin'd the next, they will be found to suffer by it extremely; for, notwithstanding there be ever so fair a Promise in the Spring, and the blooming Season go on ever so well, very few Bunches of those which succeed, will.



will come to any Thing. Nay, the Gardeners, without seeing the Cause so far back, will, at the pruning Season, be able to foretel a bad Year at these Times, the bearing Shoots being poor and crude. On such Occasions the first Crop fails, and often a second is produced, but this is always too late in the Year for its arriving at any Perfection.

On the other hand, whenever there is a remarkably dry Autumn, the next Year there is Plenty of fine Grapes, let the Season of that Year be what it will: and as this is plainly the Case in these Shrubs, it doubly holds in respect of other Trees which grow in loose Soils, and bear irregularly. I am persuaded from what I have seen of the Beech, that its bearing Years are influenced by the preceeding Season, and may be foreknown accordingly; but what I have collected from my Observations on this Head, is not yet enough to form a System.

After the Uses of the Fruit, let us enquire into those of the Wood of the Beech. In its smaller State, the Branches, as well as the worst Pieces of the Timber cleft, make a bright, clear, and pleasant Fire. The small Wood makes excellent Charcoal, and the Ashes are prefer'd to many other Kinds for using in the making of Glafs. Turners use a great deal of the well grain'd Beech in Instruments, for it cuts easy, and is capable of a good polish.

The large Timber is used in many Kinds of Work. It will stand excellently in Water, where it is always wet, but it will not do where it is wet and dry at Times. The Evenness of its Grain, and its not being liable to split, recommend it greatly to the Joiners and Cabinet Makers. Our Bedsteads in general are made of Beech; and it is the common Ground-work of those Pieces of Furniture which are inlaid with Mahogany, Rosewood, or other expensive Kinds.

It makes good Buckets, Trays, and other Utensils, as Trenchers, and the like, being easily kept clean, and looking very pretty when so: and not being so liable to crack as many other Woods.

There is another Use which makes a large Demand for good Beech, which is the splitting it into those thin Boards of which Ban-boxes, Hat-boxes, and such other light Things are made. These are all in general made of the Beech, because no Wood splits so fine, or holds so well together. The splitting it for this Use is a very pretty Operation, it was invented abroad, and when the Knowledge of it got into ENGLAND, was for some time kept a great Secret.

The shavings of Beech are bought up by the Wine Coopers, being useful in the fining of Wines, and they are a very innocent Ingredient; which cannot be said of all that are used in LONDON for that Purpose.

The best and finest Beech in ENGLAND grows in HAMPSHIRE, from whence great Quantities are sent up annually to LONDON; it there is planted generally on a dry stony Soil, and in high Situations.

The Beech would be a very proper, and a very beautiful Tree for long Walks and Ave-

nues, where the Soil and Situation are proper, for no Tree makes a more beautiful Appearance, or affords a finer or more wholesome Shade, it is therefore a Wonder 'tis not more cultivated in general throughout the Kingdom.

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## C H A P. XXXI.

### *Of the white Poplar, its Soil and Situation.*

WE have in ENGLAND four distinct Kinds of Poplar, though some of them are called by other Names. In this Chapter we shall treat of two of those four, which are nearly of kin to one another, and are too often confounded together. These are the white Poplar, and that Kind called the Abele, for these may very fitly be consider'd as two white Poplars; the other two Kinds are the black Poplar, and the aspen Tree, which differ considerably from these, and from one another.

The white Poplar is a large and beautiful Tree, of an upright and stately Growth. The Leaves are short, broad, and pointed at the Ends. The Flowers grow on some Trees, and the Fruits on others, whence the Poplars of all the Species are properly enough distinguish'd into Male and Female Trees. These Flowers, which grow on those called Male Trees, are composed of several little Leaves, and a great Quantity of short Threads; and the Fruit which grows upon the others called Female Trees, is a Sort of Pod of a thin membranaceous Substance, which, when ripe, separates into two Parts, containing the Seeds of the Tree lodged among a Quantity of soft downy Matter of the Nature of Cotton.

These Characters agree equally with the two Species of white Poplar. The Difference between them is, that the Kind commonly called the white Poplar, has small Leaves, and a rough Bark toward the Bottom of the Trunk; whereas the other called the Abele, has larger Leaves, and the Bark is smooth usually all the Way up.

These two Kinds are nearly equal in Value, and therefore it is best to plant the Abele, because it somewhat excels the common white Poplar in Beauty.

The proper Soil for the Abele is a moist rich Ground, and it succeeds best in a flat and low Situation. They are excellent where there is Plenty of Moisture; and will grow to great Advantage in many such Places, where no other Trees can thrive; and, in some, where nothing else will grow.

It is not a great while that we have got into a Way of planting this Tree in ENGLAND; we learnt it from FLANDERS, where Nurseries of Poplar are as common as of Elms with us; and 'tis to be hoped a Practice so profitable will become universal for many an Estate may be prodigiously improved by planting boggy Places with this Tree.

The Willow is at present almost the only Fen Tree. But the Poplar will thrive in most Places when that succeeds, and is a much more profitable Growth to the Owner.

Nothing is more wanted in ENGLAND than a general



general Knowledge of the Nature of Timber Trees, which would at once encourage the Taste for planting, and make it successful. Few turn their Thoughts to it; and of those who do so, the most seem not to know that there are above three or four Timber Trees in the Kingdom. Their Thoughts are all directed to the Oak, Ash, and Elm, or sometimes, but very rarely, they take in the Beech; and if one or other of these will not do, the Ground is declared not fit for planting.

Not one of these four will grow on the rotten Soil of a Fen, but the Abele will flourish there, and will yield the Owners a vast Profit; and this on Grounds which he has never made any Use of at all.

There is a farther Consideration which should induce them to planting it, which is, the Quickness of the Growth of this Tree, in which it exceeds almost all others.

A great Objection to planting is the Length of Time requir'd to reap its Benefits; People are unwilling to labour for Posterity: but in Plantations of the Abele they will work for themselves, a very few Years raises vast Trees of this Kind, and there is a ready Market.

A Man must not look for the full Advantage from an Oak Plantation in his own Life, and for that of an Ash or other quick-growing Tree, as they are called, he must wait forty Years; but when the Abele is the Tree, eight or ten Years raise it to a very profitable Bigness, and it arrives at its full Growth in less than twenty on a proper Soil, and ought to be then fell'd, and a young Plantation prepared to succeed the old one.

Not only the Profit arising from such a Plantation, but the Beauty and Ornament it affords, which are very great, speak for its being fell'd at a proper Time, which in general is about the Age I have named: for after this the Trees grow knotty and unhandsome; and every Year decrease in the Value of the Timber, which consists greatly in the Evenness of the Grain.

The Abele makes a very beautiful Avenue to an House in a proper Situation; and even the Trees, in this Case, should be fell'd at their full Growth, others having been planted between to succeed them. Their Roots should also be stub'd up, to favour the Growth of the new Plantation; and in this easy working Ground their Value, as Fuel, will pay the Expence of taking them up. An Avenue of them may be thus kept up from Generation to Generation, and always in Vigour, whereas, otherwise, they would soon grow deformed.

But though the Abele, or white Poplar, is very proper for an Avenue, it must not be planted near a Garden, because, in that Case, it would have all the Inconveniences of the Elm and Ash together, and more of its own. Its Roots would spread over the Garden Ground like the Ash, and rob every thing of Nourishment: they would send up Suckers every where like the Elm, and spoil both Grass and Gravel; and beside this the downy Matter about their Seeds will cover the Place with a Litter that is very difficultly removed, for many Months together.

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## C H A P. XXXII.

### *Of the Propagation and Uses of the white Poplar;*

**T**H E S E Trees may be rais'd from Seed, if any one should fancy such an Undertaking, but it is altogether needless, as they are to be had so many other Ways, with so much less Trouble.

They are to be propagated either by Layers or Cuttings of any Kind; or by Suckers drawn up from about the old Trees; or by Stakes, which being planted in a right Soil, will take Root as freely as a Willow Stick, and grow to a vast Bigness in a short Time.

Of these several Ways I would advise that by Layers, which will always afford the evenest and most beautiful Trees; and these take Root so easily, and bear transplanting so well, that it is pity to use any other Method in general. However, when a Man intends to raise only a few, he may be content with Suckers; and when he is in great Hast to have a good Shade, he may use the other Method by Stakes, for they shoot up quickest of all, though they make the least beautiful Trees.

When Suckers are used they are best taken up in the Middle of OCTOBER, and being then planted in the Places where they are to stand, they will quickly arrive at a good Height.

But if this be not quick enough, and the Method of Stakes be prefer'd, let them be cut at about six Foot Length, and of the Thickness of a Child's Wrist. These are to be struck off by one sloping Blow at the Bottom, and thrust fifteen Inches deep into the Ground, and no farther Care need be taken of them.

But to raise the Abele regularly, the Way is by Layers. To this Purpose the Stools must be planted in a rich and moist Ground, and treated exactly in the same Way as the Elm Stools for Layers, described under that Head. These will yield a continual Supply of beautiful and well growing Plants, which being removed carefully into the Place where they are to remain, will, in half a dozen Years, be thirty Foot high, and as thick as a Child's Waist; they will sometimes shoot nine Foot in a Season.

The Quickness of Growth, and great Beauty of this Tree, are sufficient Recommendations to those who want quick Pleasure or quick Profit. And the Uses of the Wood are many. Indeed they are not sufficiently known, nor is its Value.

In the first Place, no Wood whatsoever requires so little seasoning, for none shrinks so little: nor is any Wood whatever less affected by the Weather. All Kinds of Timber will swell and shrink with the different Heat and Cold, and Moisture and Dryness of the Air, but none so little as the Wood of the Abele, or broad-leav'd white Poplar; for this Reason it is very fit for many Uses about Houses, to which also the Whiteness of the Timber, and beautiful Grain greatly recommend it, though it be deficient in Hardness. What could be prettier than to see the Floors and Wainscot of a neat Country House of this Wood, which would have the great Advan-



tage never to shrink or swell, and would be kept clean and beautiful without Paint.

But not to dwell upon the Uses to which it might be put, let us mention those to which it is. The Wood of the Abele is excellent for Turnery Ware, nothing works more easily and freely, nor does any thing answer better for the several Kinds of Dishes, Bowls, and other wooden Vessels. A large Quantity of it is used by the Bellows-makers; and it is the Wood of which Shoe-heels are commonly made, which it is extremely fitted for, because it is light and tough.

Its Lightness makes it also supply the Place of Cork, on many Occasions, as for the floating of Nets, and the like Purposes. And where a great deal of Strength is not required, it has the Advantage of many other Kinds of Timber for making Carts and other Country Carriages, because of its Lightness.

The Loppings are tolerable Fire Wood, and the Poles that grow up strait and regular serve for the Hop Planters and Gardiners, on a great Variety of Occasions.

Where Birch is scarce they sometimes make Brooms of white Poplar Twigs, but for this Service the black Poplar, or Aspen Twigs, are more proper, because longer and tougher.

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#### C H A P. XXXIII.

##### *Of the black Poplar.*

**T**HE black Poplar is altogether like the white in its Flowers and Fruit, which grow on different Trees of the same Species: but the Quantity of white downy Matter in the Fruit of the black Poplar, is more than in any other Kind, from whence ignorant People have call'd it the Cotton Tree. The Leaves are smaller and rounder than those of the Abele, and they are of a dark shining Colour, and its Twigs are of a deeper Hue, and longer, slenderer, and of a tougher Substance.

The black Poplar loves a rich and moist Soil, as well as the white, but it will bear a little dryer Ground; and will thrive on more exposed Situations. For this Reason the Planter should make his Choice of the Kind, when he intends to raise Poplar Trees, according to the exact Situation and Condition of the Ground. Where that is low, rich, and moist, it is indifferent which he chuses; but where it is either altogether, or in any Part, a little higher, or a little less damp, he must prefer the black. The Trees are so much alike in their Growth and Appearance, that they may be planted together, with this little Distinction, of giving the lowest Places to the white, and the higher to the black; and it will never be regarded in the Regularity or Appearance.

From what I have seen, the white Poplar, or Abele, in general, will do best on the Fens, and the black Poplar on those Bogs which lie between or upon Hills; for this bears the Exposure better. But then, as these Bogs are often wetter than the Fens, this is a Caution to be observed, that the black Poplars should be planted about the Skirts and Edges of the Bog, and then the white and

Abele may be planted in the Middle; where there is Firmness enough to support them; for they will thrive very well there, under the Shelter of the others.

In many Places the Bogs between Hills are too wet and soft to support the Roots of any Tree, if not qualified first by a little draining, which may usually be done at a very slight Expence.

The black Poplar may be propagated by any of the Ways laid down for the raising of the white; but the Method by Layers is preferable to any other: and indeed in this Kind it is so far the more proper, as this will not always take Root so freely as the white.

The Method of planting the white by Stakes does very well, but it will not do for the black, at least not constantly, for they frequently miscarry.

But for those who will not be at the Trouble of a Nursery for the raising Layers, the Suckers may be taken up from about the Roots of the old Trees; and in want of these, very good Trees may be rais'd by planting small Cuttings, only these require a little more Care, and should be shaded at first. These Cuttings should be eighteen Inches long, and planted a Foot deep in the Ground; and thus they rise to fine regular Trees.

The Timber of the black Poplar is very like that of the white, but somewhat firmer. The Turners prefer that of the Abele to all the other Kinds, which they distinguish by its whiter Colour, and more even Grain; the common white Poplar they esteem next to that, and the black last: but the Difference is not great; and for Things of any Size, or where some Degree of Strength is required, the black is to be prefer'd to either of the others. They make Wheelbarrows and light Carriages of it in FLANDERS, where it is more common, and they last very well, and none are so light except of the other Kinds of Poplar which have not sufficient Strength, unless worked up in a particular Manner, and with a much larger Quantity of Timber, so that they lose one Way what they get another.

The Wood of both the black and white Poplar are used by the Carvers, but they prefer the black for the nicest Works.

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#### C H A P. XXXIV.

##### *Of the Aspen Tree.*

**T**HE Aspen Tree is a kind of Poplar, and is call'd by those Authors who write on Trees, the Poplar with trembling Leaves. It resembles the Poplars in the Flowers and the Fruit; but its Leaves are rounder, and they stand on long, weak, and slender Foot Stalks. This is the Reason of their trembling Motion which they have, in a great Degree, with every Wind, and which makes them agreeable in the View of Buildings. There is something so pretty in this Tree, upon the whole, that one is surpris'd it is not rais'd more frequently for Ornament. But 'tis left to the Woods, and rarely seen elsewhere.

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The least Wind sets the Aspen Leaves in Motion, and as they grow very thick upon the Tree, they rattle gently against one another, and the Noise is so like that of a distant Waterfall, that it would be taken for nothing else by any body who had not been accustomed to see what it was.

If we add to this its quick Growth, in which it resembles the other Poplars, though it does not quite equal them; its regular Appearance, when kept in tolerable Order, and the Value of its Timber, one would think it should be enough to recommend it to the Curious in these Matters, and that it may no longer be left a neglected Tree.

The natural Soil of the Aspen Tree is a rich and moist Earth, and it thrives best in flat and level Places; but tho' one of the watery Trees it is not so strictly as some others confined to that Situation, or Soil, for it will succeed tolerably on higher Grounds, and where there does not appear any particular Dampness. I have observ'd, however, that when it thrives in these Places, there usually is a Clay at Bottom: I have mark'd its favourite Soil in high Grounds, and found that to be almost universally a rich loamy Earth, with a clayey Bottom.

In such Places the Husbandman may plant the Aspen with a fair Prospect of Advantage; and in low Places that are not too wet, he will never be disappointed of its thriving quickly. It attains its Growth sooner in these low Situations, but the Timber is better when it has grown on higher Grounds. But this Tree is never to be raised on Gravel, Sand or Chalk, for it will make no Progress, nor will the Wood be good.

The Aspen is best propagated by Layers, which take Root very readily, and a sufficient Supply whereof may be had from a few Stools; as directed under the Article Elm. But for such as want only a few Trees, 'tis not worth while to wait this Time, and they may therefore raise them from Suckers, which rise every where in Plenty about the old Trees.

These should be taken up in the Middle of FEBRUARY, and planted immediately.

They will stand very well in Rows, Avenues, or Clumps; and may be planted in proper Soils in Hedge Rows; for their dripping is not so hurtful as that of many other Trees. They also are a very good Addition to Coppice Woods; but whether in those or whatever other Places they are planted, they should be trim'd up for Trees, not cut for small Wood, or lop'd for Pollards; for they do not yield a good Fire Wood, the young Shoots being too spungy.

This is a Fault also of the black Poplar, and of the common white Poplar: the Abele is the best of all the Class for Fire Wood, and that but indifferent.

When the Aspen is first planted, the Side Shoots must for this Reason be trim'd off, and the Tree rais'd with a naked Trunk; its Timber Part will then grow apace, and the Head will be large and beautiful.

The Aspen is not quite so speedy in its Growth as the other Poplars, but it rises sufficiently

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quick into a fine Tree. From five and twenty to two or three and thirty Years may be allowed, according to the Differences of the Soil, for the Time of its growing to a full Maturity.

It is to be felled in the End of NOVEMBER, and the Timber is fit for many Uses. It is called for in some Places by the Builder, and answers very well in Beams and Boards: in general where it is most known, it is the most valued, for there are many of our Counties where it is only seen here and there a Tree; and gazed at for a Rarity, because of the Motion of its Leaves with the Wind.

Chair Frames and Tables are made of it in many Places; and in some it is split into Pales for Parks, and Laths for Malt Kilns; for all which Purposes it is very fit. The Turners also use it for Bowls and Dishes. In some Places Trenchers are turn'd of it; but it is not so fit for this Use as many other Woods: it is white and light, but the Grain is too loose.

In some Counties they cut it off for small Wood, among the other Coppice Kinds, but it is where they don't understand its Management. Its principal Uses, when of this Size, are for Hoops, for Fuel, and for burning into Charcoal, but it does not answer well to any of them, for the Hoops are too brittle; and, as to firing, it smothers and smoaks, and the Charcoal made of it is but poor.

We name this so freely, that the Husbandman may not be misled by such Writers, as copying one another instead of consulting Experience, set down these for the Uses of the Aspen Wood. A Man who should find it unfit for these, and take it upon trust from them that it would do for no others, might give up the Intent of planting it, but tho' it is not serviceable for these Purposes, Experience shews it is for others.

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## CHAP. XXXV.

### Of the Sycamore.

THE Tree which we commonly call the Sycamore, is of the maple Kind, and has been much more properly named the great Maple, but in general it is not known by any other Name than Sycamore.

It is a large stately and fair growing Tree. The Bark is tolerably smooth, and of a dusky brown. The Wood is soft and whitish; the Leaves are very large and beautiful, they are broad and divided in a pretty Manner at the Edges, the Flowers are thready and inconsiderable; the Fruit is like the Ashen Key; but larger, and makes a pretty Appearance. Upon the whole, few Trees are better calculated for ornamental planting; so that 'tis strange it is not more generally used.

The natural Soil of the Sycamore is a rich but light Mould, where there is some Degree of Moisture, but it is not confined strictly to such: It will grow on almost any Land. We have in many Parts of ENGLAND, Instances of its succeeding on gravelly and stony Grounds; but best when there is Water near.

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The best Situation for the Sycamore is a Flat, because it loves Water; but it will grow on Hills, and it has one particular Advantage, that it will bear to be planted near the Sea, where scarce any other Tree will grow. It bears the Spray very well itself, and by its Breadth of Leaf, excellently defends any other Trees from it in the Summer; and 'tis of so quick Growth, that its Body and Arms soon become qualified to do the same Service in Winter.

This is a Thing worthy the Planters very particular Notice, because he has by this Means not only a Tree that will succeed, where otherwise he could make no Plantation; but it will defend a Plantation of any other Kind under the same Disadvantage.

The Sycamore may be raised either from Seed, or by Layers, or Suckers. The first is greatly the best Method, and this succeeds most happily of all, when the Trees are sown on the very Spot where they are to stand: but it does very well either of the other Ways; the Layers are produced from the Stools in great Abundance, and root easily; and the Suckers also grow readily: but the Trees raised from the last are usually inferior to the others in Beauty.

The Seeds are produced every Year in great Abundance. They ripen about OCTOBER, and are to be sown immediately after in good Earth. If they are raised for Removal, they should be sown in Trenches three Inches deep, drawn at small Distances; if on the Places where they are to stand, half a dozen Keys are to be laid in a Hole dug for that Purpose, and cover'd three Inches deep with Mould. They shoot up the next Spring, and grow very quickly.

If they are thus sown in a Nursery, they must be removed the next OCTOBER into another Part, and planted at a Foot Distance, in Rows two Foot and a half asunder: after two Years Growth in these, they may be planted where they are to stand.

Whether it be raised from Seeds, or Layers, or Suckers, the Side Branches are to be trim'd off for the three or four Years succeeding the last Transplantation; and after that they may be left to Nature. The same Method is to be observ'd with those raised on the Spots where they are to stand. Of the half Dozen that spring up in each Hole, only one is to stand; the others are to be pulled up one by one at different Times, and the finest left. This is to be trim'd up that it may grow to a Body. And if these Holes are dug at five and twenty Foot Distance in a double or treble Row, there will in a very few Years be a beautiful Plantation.

The Gardeners keep a Sycamore with Leaves strip'd with yellow, and this has somewhat singular in it, that the Tree bears its Fruit very regularly, and if its Keys are sown, they always produced strip'd Trees, which is not the Case with the Generality of these artificial Beauties, they requiring to be budded or grafted; their own Seed generally raising a plain leav'd Kind.

The Sycamore is not one of those Trees that produces a good small Wood, nor indeed do any of the soft Kinds, it is for that Reason we have advis'd the raising it always with a trim'd

Trunk for Timber. The small Wood does not burn well: but the Timber has many, and those very considerable Uses.

The best Time for felling the Sycamore is in the Beginning of DECEMBER; and 'tis always useful to have a fresh Stock of Trees raising between the old ones, that may thrive and grow up when they are gone. This is an easy Method, and should be practis'd in all quick growing Trees.

The Shade and Shelter of the Sycamore is excellent; and as it will bear the Mischiefs of the Sea, it will also resist the strongest Winds, so that no Tree is equal to it for the sheltering other Plantations. In some Places we see them in Hedge Rows, but rarely, though wherever it is seen 'tis counted a great Beauty. The only Part of ENGLAND where it is common, is the Bishoprick of DURHAM, where they have from Time immemorial been used to it, and plant it in Hedges, Walks, and about Houses in great Abundance.

When the Soil and all Things suit, it will grow to a vast Size. Trees of five, six, or seven Foot in Diameter are not uncommon, and at this Bigness frequently found throughout. It reaches this Size also much quicker than the Generality of Trees: for in the common Course of Nature, those Trees whose Wood is soft, arrive at their Bigness sooner than those the Wood of which is harder.

The Timber is white, and of a beautiful Grain. It is used very much by the Turners, they make of it wooden Platters, Bowls and Trenchers, Spoons, Ladles, and other of the small Utensils of the Kitchen. Some have used it in the Inside-work of Houses; it is not very strong, but it shrinks little.

The Sycamore may be transplanted when very large, only that too much Head must not in that Case be left on: but it soon recovers the Loss by the Axe, growing from an old Trunk, when once rooted, very freely. When the Head or large Branches are lop'd on this or any other Occasion, the wounded Place must be cover'd over with a Cap of Lead, or Oil Cloth; or else with a Mixture of Clay and Dung, otherwise it very easily lets in Wet to the utter Destruction of the Tree.

The Sycamore is a Tree Bees are very fond of, and it is of great Use to them; for it is oftener cover'd with a Honey Dew than any other Tree whatsoever. For this Reason also it is frequently over-run with Insects of many Kinds; for this Honey Dew is their Food, and where the Food is they will be found.



## CHAP. XXXVI.

### *Of the Lime Tree.*

THE Lime is a large, and naturally, a well growing Tree. 'Tis often injur'd by cutting into foolish Forms, but in its own Growth it is very beautiful. The Bark is brown and tolerably smooth, the Wood light and fine: the Leaves are broad and roundish, but that they



they end in a point. The Flowers are of a pale whitish Colour: each is compos'd of several Leaves which stand hollow. There is a longish Leaf on the Stalk of each Bunch of Flowers, and the Fruit is a small double Seed Vessel of a testiculated Shape.

There are three Kinds of the Lime Tree cultivated here. 1. That with larger Leaves called the common Lime. 2. The small leav'd Lime; and, 3. That with red Twigs. The Leaves of this last Kind are a little hairy, and the Fruit is square. There is also a strip'd Lime Tree common in the Nurseries, but it is no other than the common Lime alter'd by Art; and there are some others not worth the Planters Notice.

The best Soil for the Lime Tree is a good rich loamy Earth, where there is Depth and Room for the Roots to spread. But it will grow in others. Too much Moisture is an Enemy to it, and so is excessive Dryness. Where the Soil is a cold Clay, apt to detain Water a great while, the Lime should not be planted; for the Wet always chills, and frequently rots the Roots. Where there is a poor Gravel, or a very stony Land, it is not fit for the Lime. But in a Gravel with a good Mixture of loamy Earth, such as are the best of the gravelly Soils in BUCKINGHAMSHIRE, and elsewhere, it thrives very well.

This Particularity with respect to the Soil for the Lime, is the more needful to be observed, because its Bulk depends upon it: and it is for this Reason that few now grow to a proper Maturity.

In sandy Soils the Leaves of the Lime come out a Fortnight sooner than in others; and in wet, clayey and cold Lands, they fall two Months before their Time. This may be a Mark to the Planter, whether the Soil suits the Tree. For the too great Forwardness of the Leaves is as bad a Token as their too early Decay.

In such Soils the Lime will live without flourishing; and those who have seen it only in such, will not know what may be its Value. The Lime, in a favourable Soil, will grow to ninety Foot in Height; and has been measured twelve, fourteen or sixteen Yards round the Trunk, and entirely sound.

'Tis not only here and there a Tree that thrives thus, whole Plantations rise to ten Yards round with great Regularity; nor is the Lime one of those slow growing Trees, that reserve their Profits for another Generation.

The Husbandman who knows this, will see what may be the Advantage of planting this Kind when he has a proper Soil. For, as the Timber is of some considerable Value, such a Quantity as is contain'd in Trees of this Height and Bigness, is an Article very well worth his Regard.

The Lime loves a Situation somewhat raised. It will grow very well on Hills; but upon a small Ascent, with a due Depth of some free Soil, is the Place of its greatest thriving.

It may be propagated three Ways, by Seed, by Suckers, or by Layers; but the last Method is much the best. If any one chuse to raise it from Seed, he must gather his Seed carefully in the End of OCTOBER, when it is

fully ripe, and from a thriving Tree. This he is to lay up in Sand till FEBRUARY, and then sow it in a Nursery Bed, from whence the young Trees are to be removed the first Autumn into another Part of the Nursery, and transplanted into their proper Places at four or five Years Growth.

Those who want only a few Trees, may raise them from Suckers taken from the Roots of the old ones, chusing the straightest and best, and setting them at once where they are to stand; defending them by a Hedge, Pale, or Bushes, till they have got a little Strength.

But the Way I advise is to raise them from Layers, as directed under the Article Elm. The Stool must be planted in a deep light Soil. The Shoots are to be laid down in SEPTEMBER; and the SEPTEMBER following they must be removed into Beds four Foot distant in the Rows, and two Foot from one another. They are to stand in these Beds four Years; and then to be removed to the Places where they are to stand, after which they require little or no farther Care.

While they stand in the Nursery it will be well to dig up the Ground every Spring between the Rows, and to take off all the large Side Shoots, leaving only the small ones to detain the Sap.

There is little Difference in the Timber of the three Kinds of Lime Tree. The small leav'd Sort yields somewhat the hardest Wood: the other two shew scarce any Difference. They bear more Moisture, and a lower Situation, than the small leav'd one; and by this the Planter may be directed in the Choice of his Kind, suiting it exactly to the particular Nature of his Ground.

The Lime may be transplanted at a very large Size, by taking it up with a Ball of Earth about the Root; but to ensure the Success, the Head should be cut off. In this Case less Care and Trouble are requir'd in the doing it. The wounded Part in these Transplantings, must be well secured by a Covering of Clay and Dung, or in some other Manner as has been before directed, and there is then no Fear of Hurt.

The Beauty and free Growth of the Lime have recommended it greatly for Walks and Avenues; and the Fragrance of its Flowers is a great Consideration in its Favour, but the Leaves decay so soon that many are displeased with it. 'Tis one of the first Trees that puts us in mind of the Approach of Winter, and in a disagreeable Soil much sooner than in others. Its Leaves will sometimes fall in the End of AUGUST, so that it is a Month or five Weeks sooner than the Generality of our other Trees. This disagreeable Circumstance, together with the Dirt and Litter such a Number of Leaves make, disgusts People very much, and has banish'd it from many Gardens; but, in a proper Soil, the Planter will not find the Advantage less, because it wants something in the Article of Pleasure. And to answer those Disadvantages that have been named, it has two Benefits in which few Trees excel it: scarce any Tree bears the Fury of the Winds better, or is less liable



liable to ordinary Accidents; and it is very little apt to grow hollow.

In many Plantations of some standing, one sees the Elms shatter'd by Winds, and decay'd within; while the Limes in the same Place, tho' they have grown longer than was needful for Profit, are entire, sound and flourishing, though expos'd to all the same Accidents.

The Wood of the Lime is light, and of a good Grain, not liable to split. It cuts easily, and is excellent for Carvers. It is the common Wood used in making of Models; and the Turners make a great deal of their Ware with it. The Farmer and Husbandman prefer it to others for many of their Implements, as it is very light, and yet of sufficient Strength: and 'tis fit for paling, and the other common Uses of Timber.

The Gun Powder Makers are very fond of the Coal of the Lime Tree, they always use that of some light Wood, frequently the Alder, sometimes the Willow, but none answers so well as the Lime, because a well-burnt Piece of fine Charcoal has the Qualities of the Wood, and is light and strong both.

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#### C H A P. XXXVII.

##### *Of the Walnut Tree.*

**T**HE Walnut Tree may be consider'd by the Gardener on account of its Fruit, but the Value of its Timber gives it a Title to stand among our List of Trees raised for that Purpose, since it will be very well worth the Husbandman's while to plant it, independently of any other Consideration. The Quantity, as well as the Price of the Timber, is a very great Article in this Account.

It is a large spreading and beautiful Tree. The Leaves are each composed of several others standing on the two Sides of a middle Rib, with an odd one at the End. The Bark is of a pale brown, and smooth; the Wood firm and beautifully vein'd. The Flowers are little and inconsiderable, they hang in Strings, and are composed of some Threads and chaffy Leaves: the Fruit in the Walnut, consisting of a green ill-tasted Rind, a hard Shell, and within all the Kernel cover'd with a thin Membrane. This Fruit does not follow the Flower in its Place, but grows on another Part of the Tree. This is a Course taken by Nature, very frequently in Trees, but more rarely in Herbs, though we see Instances of it familiar enough.

Those who write on these Subjects, mention six or eight Kinds of Walnut, and distinguish the Trees that bear them by so many distinct long Names, but these are only Variations made by Culture; and the Planter who considers Timber more than Fruit, needs not regard them. There is in Reality but one Kind of Walnut Tree common in ENGLAND, and that is the same, whether the Fruit be smaller or larger, and whether it have a thicker or a thinner Shell. There have of late Years been some distinct Kinds brought from AMERICA, under

the Name of Hickery, but though the Nursery-men raise these, the Planter has nothing to do with them. If they be equal to the common Walnut Tree in the Timber, they want the Advantage of the Fruit, for theirs is of no Value; and this, though a trifling Consideration, yet need not be altogether neglected.

There are some who prefer the Hickery Wood to our Walnut Tree; but if they are fairly compared together, the ENGLISH Walnut will be found to have the Preference. The Wood of the Hickery or AMERICAN Walnut, and especially of the black Kind, is harder than our Walnut, but it has not the Toughness: it is often beautifully vein'd also, but not comparably to the finest of our ENGLISH Walnut.

The Kind called by our People, the small white Hickery, has the Advantage of quick Growth; but then the Wood is not equal to that of the other Kinds.

I have judg'd it needful to enter thus far into the Difference of these several Kinds of Trees, to prevent the Husbandman who intends planting, from being deceived by such as are half acquainted with them, and are always more positive than such as have searched deeper. He may be told that the VIRGINIAN Walnut is a quicker growing Tree, and has a harder Wood than the ENGLISH, and that may tempt him to plant it in Preference; to his great Loss. 'Tis fit therefore he should be inform'd, that it is one Kind of this foreign Walnut that is of quicker Growth than ours, and another that has harder Wood: as also, that he would never be able to sell either of the Timbers for ENGLISH Walnut-tree, to an experienced Cabinet-maker; or to get nearly the Price for them that he may have for the other.

The Walnut Tree thrives very well in a dry Soil, and will bear a gravelly or stony one without languishing, but its favourite Earth is a deep and rich Loam. We have some Grounds in SURREY, where there lies at six or seven Foot deep, a Bed of a chalky Marle. There are Walnut Trees planted on these, and they thrive greatly.

Let the Husbandman who is about to plant, search after a light but firm Soil for his Walnut Trees. They will rarely deceive his Expectation any where, but it is on such Lands as these that they will yield their full Advantage. A cold Clay is to be avoided; nor is the Walnut to be planted where there is too much Moisture. Its own spreading Branches keep the Ground at all Times cool and damp about its Roots, and too much Wet does not evaporate well in such shaded Places.

The Timber of Walnut Trees that have grown in a chalky Soil, or in a very light and sandy Loam is found best; and that is always worst which is yielded by Trees that have grown in the Way of too much Moisture: this makes the Wood less firm, and hurts the Colour.

The proper Situation for the Walnut Tree is a little rising; the Tops of Hills are too bleak; and the low and flat Grounds are apt to be too damp.

The Walnut should be raised from Seed, that is, by sowing the Nut; and it should always be sown



sown in the Place where it is to stand. The common Practice is to raise them in a Nursery, and remove them at four or five Years Growth into their Places; but this is very prejudicial to the Planter. I am sensible that the Nursery-men will all tell the Farmer that the Wallnut Trees are much better which have been removed, than those which have always stood in the same Place: but he is to understand that there is a Difference in his Design from what the Nurseryman intends. In the transplanting a Wallnut the long or tap Root must be cut, and this consequently stops the upright Growth of the Tree, making it spread into a great Number of Branches at a small Height; and such Trees are best for bearing of Fruit, which is all the Nurseryman thinks of: but it is the Interest of the Person who plants for Timber, to have the Tree rise to some Height, with a good Trunk; and in order to this it must never be removed at all.

The Wallnut Tree should stand in a Plantation at five and thirty Foot Distance, and may very well be set in two Rows forty Foot distant from one another. More will not do well, for they will rob each other of Nourishment.

When such a Plantation is intended, let some good sound Fruit of the common Wallnut, not the FRENCH, or the fine thin shell'd Kind, be collected with Care from a tall Tree, just when the green Rind begins to crack.

Let these be laid in a large Tub, with the Rind on, and with some dry Sand about them, till the next Spring.

In the Beginning of FEBRUARY let the Ground be mark'd out by Measure, for the Plantation, and a Hole of two Foot Diameter dug in the Place where each Tree is to stand. The Earth being well broken and put into the Hole again, let eight or ten Wallnuts, taken out of the Sand, be carefully set in it at equal Distances, with the green Rind on, and cover'd three Inches deep with Earth. Then let the Places be cover'd with a few Bushes, and all left to Nature.

Wallnuts often miscarry, but from the Number here directed to be set in each Hole, there will rise three, four, or more Trees. These are to be carefully taken up one by one, at different Times, till only one is left in each Spot, and that the most thriving and best looking Plant.

Great Caution must be us'd not to disturb the Root of the Tree that is to stand, in the taking up of the others: they must be rais'd very gently; and the Earth closed about it when they are taken up, and a little sprinkling of Water allowed for the setting of the Ground thoroughly about the small Fibres.

When the Tree is left single it must be defended from Accidents, by Bushes planted round it, not by paling, as some do, for that hinders the free Course of the Air; and the Wallnut is found to require it more than any other Tree.

The Planter will remember that he raises his Tree for Timber, and that 'tis his Interest to carry it up in a good Trunk: but the Wallnut is particular in this also, that no Tree bears the Loss of its Branches so ill.

Such Boughs as threaten to spread from a small Height, must be carefully removed; and all the Care of this Kind must be taken while it is very

young, for the taking off a Branch of any Bigness in the Walnut always endangers the Tree. If that should ever be needful, it must be done just at the Fall of the Leaf, and the Branches must be cut off smooth and even, close to the Body: after this the Trees are to be left to themselves, and will soon yield a Profit from their Fruit, which will give the Planter Patience to wait for the Growth of the Timber.

It will be seen by the particular Treatment necessary for raising the Wallnut Tree for Timber, that no general Direction can serve for the Propagation of all Kinds of Trees. Each has its particular Nature, and demands more or less a particular Management. The Reader therefore will not call us tedious that we have delivered the Method of raising each separate; or accuse us of repeating the same Practices for the raising several Kinds, seeing those Practices are only the same in generals; and vary altogether in the particular Instances.

It is necessary not only to lay down the right Methods, but to guard against the wrong. It is a common Practice in those who raise Wallnut Trees from the Nut, to lay a square Piece of Tile under the Nut they plant, at two or three Inches Depth. The Intent of this is to stop the great and strait Root, and make it break and spread. This is right in the raising the Wallnut Tree for Fruit; but altogether wrong when it is intended for Timber, because the long or tap Root, in that Case, is more useful than all the rest, and is the very Thing that carries up the Trunk to a due Height.

We have observed that the Wallnut Tree for Timber should be planted only in one or two Rows, and that at a due Distance: in this Case the Tree, being carry'd up to a proper Height in the Trunk, is to be left to spread as Nature directs; and never to be lopped. But if any one shall chuse to set it among other Timber Trees in a Wood; it must be lopped up to a great Height, the Branches being taken off, as already directed, and thus it will fare like the rest of the Shoots, and grow sociably among them.

The Wallnut may also be planted in Tillage Ground, but at a great Distance. Wallnut Trees in Corn Lands standing at a hundred and fifty Foot Distance do no Harm. Their Roots penetrate deep for Nourishment, so that they neither rob the Crop, nor lie in the Way of the Plow. They thrive excellently in these Places; the frequent Stirring of the Land contributing greatly to their Growth, and they are a Defence rather than an Injury to the Ground.

Wallnut Trees rais'd in the Manner here directed, serve excellently for Avenues, and in other regular Plantations: and when planted merely for Gain, on Grounds of little Value, they are beautiful as well as profitable. The largest Plantations of Wallnut Trees any where in ENGLAND, are in SURRY; and the Owners find so great Advantage in them, that they take Care to keep up a continual Supply for Deficiencies.

In these Plantations the Husbandman is to take Care that the Soil be not sandy underneath; and that the Situation do not expose them too much to cold Winds; with this Caution the Plantation will never fail, though according as the Soil is more



or less favourable, the Growth will be quicker or slower.

As the Fruit of these Trees, though rais'd for Timber, is not to be neglected, I shall caution the Farmer against a vulgar Error. 'Tis said that the Walnut Tree is the better for beating; and this is handed down from Generation to Generation, in Rhymes and Proverbs. But it is altogether false. As it would be tedious and difficult to gather Walnuts by hand, People got into a Custom of beating them off the Branches with Poles; and from the general Practice they came, at last, to think it was useful to the Tree: but this is altogether an Error. Though beating may be allowable for Convenience, it is not to be commended: and he who has a due Care of his Trees will do well to see it be done as gently as possible.

A great Quantity of Leaves are usually beat down with the Fruit, and these had better be swept away than trampled into the Ground: for there is something in the Juice of the Walnut Leaf not favourable to the Soil. If, after these Leaves and broken small Branches are swept away from under the Tree, some fresh Ashes be scattered over the Ground, they will greatly assist both the Tree itself, and all that grows about it.

If any other Kind of Walnut Tree be desired for Variety in the Plantation, that which is called the black VIRGINIAN Kind is the best. It will do as well on our Soil as in its own native one: but it is a slow Grower, and the Fruit is of no Value. The Wood of this Kind is pretty, being mostly black and white, but it is brittle.

The Walnut Tree Timber so much valued in FRANCE, and called Grenoble Wood, from the Place where it is rais'd in the greatest Quantity, is no other than the common Walnut. It bears what we call the large FRENCH Walnut for Fruit, but this does not, in any thing essential, differ from our common Kind.

The Time of felling the Walnut is toward the End of NOVEMBER: and its Value depends so much upon the accidental Course of the Grain, that it is utterly impossible to make a Judgment of it till the Tree is cut down, and it can be seen. Walnut Timber is always of a certain Price with its least Beauty, but when the Grain runs fine it encreases the Value beyond Computation.

One thing I shall tell the Planter from many Observations, which is, that this veining of the Wood is usually finest in the driest Soils, and in such Trees as have been longest in attaining to their Size. There are Soils so dry that this Tree will not thrive in them at all, but where it will live Nature has made this Amends for the Tedioufness of the Growth.

The FRENCH use the Timber of the Walnut in building, and for the largest Works: with us it is, in a Manner, confin'd to two or three Trades, who employ it in smaller Works. The Cabinet-makers consume the greatest Quantity, and take the finest Wood: they use it sometimes solid, and often in enlayings. The Part which is not beautifully vein'd is used by Coachmakers for the Body of the Coach, as also for the Wheels in many Places; and the Stocks of Guns, and many other such Things are made of it.

The finest grained Part of the Tree is always that which is nearest the Root: but in general, where one Part is very good, the rest has its Beauty, though in an inferior Degree. We sometimes see the Wood brought from VIRGINIA worked into ornamental Things at the Cabinet-makers, and when the Pieces are well chosen it is often very pretty.

When a Walnut Tree is well grown it affords a great Quantity of Timber; and every Part of that is thus of certain Sale, though some at a larger Price than other; so that taking in the Benefit of the Fruit, which in this Consideration is to be understood as an accidental Advantage, no Tree is more profitable.

#### C H A P. XXXVIII.

##### *Of the Horse Chestnut Tree.*

THE Horse Chestnut is cultivated more for its Stateliness and Beauty, than for the Value of its Timber: however, as it is a quick Grower, the Quantity will, in some Degree, make Amends for the Defect of Goodness; and as there are Places where it will thrive, that will scarce do for any other Trees, it may be worth the Husbandman's while to be acquainted with it, that he may use it on proper Occasions.

It is a large Tree, very regular in its Growth, and at its flowering Season of uncommon Beauty. The Bark is of a deep brown and rough, the Wood soft and whitish. The Leaves stand several together at the End of a single Foot Stalk, dividing like Fingers. The Flowers are white, with a blush of red, and grow in Spikes, the Fruit is contained in a prickly Husk, and is large and brown.

The Nurserymen raise Horse Chestnuts with strip'd and blotch'd Leaves, white and yellow, but these are only Varieties of the common Kind. The Tree is a Native of the East, but it bears in our Climate perfectly well, and flourishes as if it were originally of our Growth.

The proper Soil of the Horse Chestnut is a light rich Earth; but it will grow in sandy, gravelly, or stony Land; and particularly where there are large Beds of Sand underneath, which will not suffer other Trees to thrive. In these Places it will be profitable to plant the Horse Chestnut; and it will do whatsoever be the Situation; though its most favourite one is the Side of a Hill.

The Horse Chestnut may be propagated by Layers or Suckers, but it is much best to raise it from Seed. This may either be done in the Nursery, or in the Places where it is to remain, but the latter is much the better Way. The Ground is to be marked out for this Purpose, and a Hole opened at every thirty Foot Distance: into these Holes, when fill'd up again with their own Earth, are to be put the Seeds, gathered in their State of Maturity, from a flourishing Tree. Four or five should be put into each Hole at a Distance one from another, and when they have shot, the worst Plants are to be removed, leaving only one at last to grow into a Tree. These are to be trim'd up till the Boughs will be out of the



the Reach of Accidents, and then left to Nature. They usually grow of themselves very regular.

The quick Growth of the young Branches of this Tree has surpris'd many. At the shooting Season they will all uniformly grow an Inch in a Day and Night; but this will appear the less wonderful, as we examine the Tree more strictly: for we shall find that the whole Growth of a Year is performed in about eighteen or twenty Days at this Season: all that is done afterwards being only the giving these young Shoots Strength and Firmness.

The Horse Chestnut, by its own natural Growth, becomes pyramidal, being largest at the Bottom, where the Branches begin, and smaller all the Way to the Top, but it does not terminate there in a sharp but blunt Point.

As the Tree is thus regular in its Shoots, there is no Need of lopping to bring it into Form. The Time of felling it is during the whole Winter: but it is of little Value, more than for the Fire. In some Places they make the Implements of Husbandry of its Timber; and if there were not Plenty of other Kinds, it would probably be more enquired after. The Branches make very good Faggots, and the Trunk cleaves into Billets, and it burns better than any other of the soft Woods: though not so well as the hard Kinds.

The Fruit has a pretty Appearance, but is of no Value: abroad they give them to Horses and other Cattle in their Provender, partly as Food, and partly as a Medicine against Disorders in their Lungs; but we pay no Regard to them, though there is no doubt of their being a wholesome and good Nourishment.

#### C H A P. XXXIX.

##### *Of the Chestnut Tree.*

**T**HIS is a Tree very much superior to the former in every Respect; the Timber being excellent for many Uses, and the Fruit pleasant and wholesome. The other has been called by the same general Name of Chestnut, because of some Resemblance of the Fruit in Colour and Shape, and in the outer Covering; but the Trees are altogether different in every other Respect.

It is a tolerably large, but not a beautiful growing Tree. In that Respect the Horse Chestnut has entirely the Advantage, as also in the Beauty of the Flowers: but the Leaves of this are very handsome, they are large, long, of a fine bright Green, and indented beautifully at the Edges: they stand singly, not several upon the same Stalk. The Bark of the Chestnut Tree is brown and tolerably even, the Wood firm and dark coloured. The Flowers are small and inconsiderable, they hang in Strings: the Fruit is the common Chestnut which we eat: it grows upon a different Part of the Tree from the Flowers, and has a rough or prickly Husk. Two or three Chestnuts are contained in each Husk.

There is but one Kind of this Tree that the Planter is to regard, but that is very worthy of his Notice, because the Fruit is valuable as well

as the Timber. Our Nurserymen raise a small Kind from VIRGINIA, called the Chinquapin; and they stain the Leaves of the common Kind; but the little Sort is not worth planting, and the strip'd Leaves of the other are only an accidental Variety.

It is a great Advantage in the Chestnut Tree, that it will grow in almost any Soil or Situation, It naturally thrives best in a sandy Loam, on the Side of an Hill, but it may be rais'd in gravelly, stony, or chalky Ground; and will stand the strongest Winds in the highest Situation, for it roots very deep, and does not carry so tall and large an Head as many other Trees.

Too much Moisture in a Soil will hurt the Growth of the Chestnut; and it will much better bear a dry and harsh Land; but it will live almost any where; and bear great Quantities of Fruit in the worst Land. Even wet is not an utter Enemy to the Chestnut Tree, unless when it is detained about its Roots. A moist Gravel is a very favourite Soil for it: the clayey Bottom of a Soil that will not let Water run off, is the most destructive of this, and of other Trees that don't affect Moisture, for it chills and rots their Roots.

The Chestnut is to be rais'd from Seed; and the Fruit of this Tree so far enters into the Consideration as an Article of Husbandry, on this Occasion, that a great Part of the Expectation of good Trees is founded on the Choice of it.

The Chestnut ripens its Fruit very well in ENGLAND, but the Planter should not raise his Stock from these. We import yearly a great Quantity of Chestnuts from SPAIN and PORTUGAL, for the Service of the Table; and these are to be prefer'd greatly to those of our own Growth for the setting for Trees.

Let the Person who intends to raise Chestnuts purchase a Quantity of these at the Season of their coming over, which is in Winter. Let him buy twice as many as he will have Occasion to use; and lay them carefully up till Spring, in some Place where they will neither be too dry nor too moist, and where Vermin cannot come at them.

In the Beginning of FEBRUARY let him prepare to set them in the Ground. But in order to this let him examine his Parcel, by throwing them all into a Tub of Water. Part will sink to the Bottom, and part will swim upon the Top of the Water. Those which swim are naught, the others are sound.

They may be rais'd either in Nurseries, or in the Places where they are to stand. But as the Fruit is some Consideration in this Tree; and the Timber is not so valuable as in some others, it may be as proper a Method to raise them in the Nursery, and transplant them afterwards. In general, when the Timber only is regarded, and fine Timber bears a great Price, the best Method is to raise the Trees in their Places, but in those which bear Fruit, it is as well to raise them in Nurseries.

To this Purpose the Place for the Nursery being chosen in a poor Ground, let Trenches be opened in the second Week in FEBRUARY, four Inches deep, and six Inches asunder. Let the Chestnuts be planted regularly in these, one every four



four Inches, with the Eye uppermost; and let the Earth be drawn over them.

Half a Dozen of these Trenches must be made, and then a Space left by way of Alley, to get between and clean them; and then another Bed of six Rows made as before; thus proceeding till such a Quantity of Chesnuts are planted as will serve for the intended Trees; and for a Supply to such as may want in the Neighbourhood; for there are usually some who will be glad to buy the young Trees at a small Price, which takes off from the Expence of the Nursery.

When the Chesnuts are planted, Traps must be set all about the Ground for Vermin, else they are so delicious a Bait, that they are often devour'd.

They will appear above Ground in two Months, and they are then to be kept clear of Weeds, and to stand two Years. At the End of this Time the young Trees must be taken up and planted at two Foot Distance, in Rows a Yard asunder. In this removing, the long tap Root is to be cut off; and Care taken not to injure the others.

The best Season for transplanting them is early in MARCH, and from this Time Care is to be taken of their growing upright and strait, by trimming off the Side Shoots; or where they will spread too low, by cutting them off down near the Ground, taking Care to do it where there is a Bud. They will shoot up from this a single strait Shoot, and become fair and flourishing Trees.

After they have stood four Years in this second Place, that is, when they are six Years old from the first sowing, they may be removed into the Places where they are to remain.

The Chesnut is a very good Tree for Avenues, for Clumps in Parks, and for many other Kinds of Plantations, where the Beauty of the Leaf, and Value of the Fruit are regarded. They may be set at about twenty Foot Distance, and will afford a considerable Quantity of Timber.

This is used by Joiners and Cabinet-makers. At one Time 'twas a Custom to employ it in the Way of large Timber for Beams in Houses. At present 'tis more used in small Works, as for Tables, Bedsteads, Chairs and Chests; in which it makes a pretty Appearance.

In some Places they make Wine Casks of it, and it is said to give less Taste to the Wine than many other Woods.

It has much the Appearance of Oak when dry'd and cut out; and the smaller Purposes of Oak are answer'd by this in common. They make Laths of it as regularly as of the Oak, and the Workmen purchase them at the same Price. In those old Buildings where Chesnut Timber has been used instead of Oak, many a Workman has been mistaken, and passed it over as Oak on his Examination. It will bear to lie continually in Water, and is therefore used in Mills and Sluices; but where it is at Times wet, and at others dry, it comes to nothing.

The Timber of the Chesnut is season'd by dipping it in boiling Oil; and if after this it

be pitched over, there is no End of its lasting.

When the Chesnut is planted in Coppices, or cut down in the Manner of Coppice Wood, it affords strait, strong and even Poles, that are fit for the Service of Hop Planters, and on many the like Occasions. But it must be acknowledged, that the Timber, although it has the Appearance of the Oak, has not its Virtue of long remaining sound, for it is very apt to grow rotten: and will often have a very fair Appearance on the Outside, when there is only Dust deep within.

## CHAP. XL.

### *Of the Service Tree.*

THE right Service Tree is a tall and beautiful Tree, and very well worth planting for its Timber. There are two or three other Kinds which are called by the same general Name, and they agree in the Nature of the Wood, as well as in the Flowers, and the Shape of the Fruit; but they vary in the Shape of the Leaf, and the Degree of Goodness. These other Kinds are distinguish'd by the Names of the Service Tree, with the Fruit red in the Middle. 2. The short fruited Service; and, 3. The wild Service or Quick Beam.

The first is the most valuable, and the two next come nearest its Nature. The last differs more, and as it is not generally accounted of the Service Kind, but called by a distinct Name; I shall treat of in a Chapter by itself. The Flowers of the others are much alike, they appear early in Spring, and the Fruit is very rough to the Taste till thoroughly mellow. All the Summer it makes a beautiful Appearance.

The best Soil for the Service Tree is a tough and firm Loam, with some rich Earth among it. Such are very common toward the Foot of Hills, or on any gentle Ascent, and these are the best Situations also for this Tree. When the Soil is too light, the Tree grows very slowly; and when it is too dry, the Fruit is ripen'd very poorly, neither do the Leaves stand their Time. When the Service is judiciously planted, it grows quick, and answers very well to the Husbandman; but when the Plantation is made at random, none answers worse. Few know its Value, because few have given it a fair Trial; nor is its Timber so much known, or so common to be had, as it ought to be, for this very Reason. He who will fall into the Method of raising these Trees, will do a Service to the Publick, as well as to himself; for there needs but a beginning to incite others, and the Consequence would be a ready Market for the Timber, and it would prevent the Importation of a great deal of foreign fine Wood; which, however called by sounding Names, is inferior to that of the Service Tree in Beauty, and in Value.

The Service may be raised from Seed, but the better Way is by Layers, which take Root very freely, and are naturally produced in great Abundance. The Method of raising Trees this Way,



Way, has been laid down under the Article of the Elm, and need not be repeated. Those who have a mind to raise them from Seed, must sow them in shallow Trenches, in a Nursery, and keep them clear from Weeds. At two Years old they must be planted out at a Yard Distance, and three or four Years after that, be set where they are to stand. Such as want only a few Trees, may conveniently enough raise them from Suckers, which grow about the old Trees in great Abundance. These are to be transplanted early in Spring, and they take Root freely.

Which ever Way the Service Tree be rais'd, it should be carefully trim'd up for the first eight or ten Years, that it may not spread into Branches till a certain Height, when there will be a handsome Trunk for Timber. After this it is best left to itself.

It is a very proper Tree for Avenues, Clumps and Hedge Rows, and 'tis great Pity that it is not more frequent. Its Beauty should be an Inducement to the Gentleman, and its quick Growth and valuable Wood to the Husbandman.

The Grain of the Wood is very beautiful, and its Variegations often exceedingly pleasing. It is excellent for the Cabinet-maker, the Turner, and the Carver, being soft, and yet sufficiently firm. The Stocks of Guns are sometimes made with it, and Escutores, Chairs and Tables. It also serves for many of the small Works in Wood; and when properly oil'd and varnish'd, imitates and supplies the Place of the foreign Woods in several of the ornamental Pieces of Furniture, and nice Instruments.



# C H A P. XLI.

## Of the Quick Beam.

**T**HE Quick Beam, or, as some call it, the Quicken Tree, or according to others, the wild Service, or the flowering Ash, for it has all these Names, is properly a Kind of Service Tree, though, from its particular Form and Uses, treated of here separately. It is a beautiful but small Tree, being one of the least of those that are accounted Timber Trees, or planted for that Purpose.

The Bark is pale and smooth, the Leaves are beautifully form'd, each being composed of many smaller, which are long, narrow, and finely dented at the Edges. The Flowers stand in great Bunches at the Ends of the Branches, and are whitish, large and handsome: and after these come beautiful Berries red like Coral.

This elegant little Tree is Native of ENGLAND, and is a great Beauty and Ornament to our Coppices and Hedge Rows, in those Counties where it is most frequent. Its fair Appearance has occasion'd its being taken also into Gardens, where it makes a fine Figure in the Wilderness Quarters.

The best Soil for the Quick Beam is a light and dry Loam; and it grows best on a somewhat rising Situation. No Tree is better suited

to thrive in Hedge Rows, where the Soil is light and dry. It roots itself very firmly; and shoots up in a moderate Time to its full Stature.

The best Way of raising the Quick Beam is from Seed. The Berries are to be gather'd when full ripe, and sown after they have been spread a Fortnight in a dry airy Garret. They shoot up very regularly and freely, and should be removed from their first Bed to some other Part of the Nursery at two Years Growth, and planted at two Foot Distance. Three or four Years after this, they are fit to be transplanted to the Places where they are to stand; and a small Nursery will thus, with little or no Trouble, raise such a Quantity as will stock a large Piece of Ground; where being set in Hedges, or the Banks of Coppice Woods, and other such Places, they will quickly grow to some Value.

Those who would only raise a few Trees, may take up Suckers from about the old ones, for they rise in Abundance, and grow freely.

The Quick Beam should have very little trimming or lopping; for, as it is not to be carried to a large Tree, 'tis best left to Nature, the Branches of themselves growing with a pretty Irregularity.

Few of our Trees are more hardy than the Quick Beam, or better bear the cold Winds: so that the Farmer who has a light Soil in such an Exposure, as few other Trees will bear, may plant this, which will be a Shelter to his Grounds, and after a few Years may be felled to Advantage, he taking Care to raise young Trees between the old ones by way of Supply.

The best Time for felling it is in NOVEMBER, for at that Time the Wood is in a Manner all Heart, and is more lasting than such as is cut at other Seasons.

The Timber of the Quick Beam is tough, and not heavy. It is used in making all Sorts of Carriages, from the Wheel-barrow to the Coach. Where it is in Plenty, the Farmers make most of their Implements of it; and it answers their Purpose so well, that it would be worth their while to plant it much more generally than they do for their own Service.

We have before set down the Methods of raising the more valuable Kinds of Timber Trees, but it is fit the Husbandman should understand the Nature, and the Culture of all; that where one Kind will not do he may plant another, so that no Part of his Ground may be without its Use.



# C H A P. XLII.

## Of the Birch.

**T**HE Birch is a Tree of a moderate Size, quick Growth, and very pretty Appearance. It also answers many Purposes in the Affairs of Life, though not of the most important Kind, and produces the Owner a tolerable Profit, though its Price come not near that of the several large and more considerable Timber Trees.

Its Bark is smooth and glossy, its Leaves



are roundish and of a fine green; the Twigs are reddish, and very slender and knotty: well known to School-boys. The Flowers are small, and hang in Catkins like those of the Hazel. The Fruit grows on other Parts of the Tree, and is a little light Cone. There is no Choice of Kinds in the Birch, for we have but one: it is remarkable of this Tree that it naturally casts its outer Bark every Year.

The Birch Tree is a Native of our Country, and it seems indifferent to all Kinds of Soils and Situations; it will live on sandy Hills, and in the rottenest Bogs: and it will stand in Hedge Rows, though its best Situation is in Coppice Woods. No Soil is too barren for it: whether it be gravelly, stony, chalky, or whatsoever, the Birch thrives upon it. But though it will do on any Ground, 'tis fit the Husbandman be inform'd, that for quick Growth, and the best return of Profit, he should plant it in the damper Parts of some Coppice Woods, where it grows up quickly to such a Size as to be useful.

The Birch Tree is best raised from Suckers. These are produced in great Plenty about the old Trees; and are to be taken up in FEBRUARY, and planted where they are to remain. They will take Root freely, and shoot quick: but in order to make them grow in the best Manner, the Planter should, when they have stood two Years in their new Place, cut them down four Inches from the Ground, and watch the new Shoots. He is to reserve the fairest and straightest of these; rubbing the rest off: and in this Manner the Birch with a little Care at Times to prevent its sending out Side Shoots too low, will rise to a tolerable Tree. But it is not worth while to keep it to any great Growth, for the Timber brings but a poor Price.

The best Time for felling the Birch is the End of NOVEMBER; for no Tree abounds so with Sap in the growing Months, and 'tis best to cut it when that is most down.

The Timber is light, but has some Strength. It is used for making light Carts and Yokes, and many other Things in the Farmer's Way, for it works easily, and is tolerably lasting. Turners use the large Wood for Bowls, Dishes and Trenchers: and the less useful Part makes excellent Charcoal. Brooms are made of the Twigs: a great deal of Birch is raised for this Purpose, and near large Towns, yields a very considerable Profit.

When the Birch is intended for this Use, it is to be planted just as before directed, only when it has stood one Year it is to be cut down to the Ground, or within a few Inches of it; and all the Shoots are to be suffer'd to grow. These soon become fit for Hop-poles, and other such Uses, and furnish Abundance of Twigs for the Broom-man.

Hoops are in some Places made of the Poles, and Bakers Panniers frequently of the Timber. Smalcoal is generally made of the Brush Wood of the Birch; though any other light Wood answers the same Purpose. The Antients wrote upon the Bark of the Birch instead of Paper.

Lastly, We are to mention the Use that is made of the Sap of this Tree for Wine. It bleeds the most freely of all our ENGLISH Trees,

and its Juice is not only the most in Quantity, but the best of any for this Purpose. The Time of tapping the Tree is in the Beginning of MARCH, the Juice which runs freely from the Wound is of a pleasant Taste, and being work'd up with Sugar, or with Honey, which is the better Way, makes that agreeable Liquor called Birch Wine, or Birch Mead.

There are two Ways of getting the Sap; the one by boring a Hole in the Tree, and the other by cutting off the Ends of some of its Branches. When a Hole is bored in the Trunk, a Piece of Chip is to be set against it to guide the Sap into the Vessel put to receive it; when the Ends of the Branches are cut off, they are to be let into Quart Bottles, a great Number of which may be hung upon one Tree, and will quickly receive their Quantity of the Sap.

The Sap runs most freely in the middle of the Day, and in the warmest Weather. A South or West Wind sets it a going; and a North or East stops it, or makes it drip much more slowly. This, when made into Wine, is a pleasant and wholesome Drink, and has a considerable Effect in sweetening the Blood; and curing the Scurvy.



#### C H A P. XLIII.

##### *Of the Horn Beam.*

THE Horn Beam is a beautiful and regularly growing Tree. Its Bark is brown and tolerably smooth, and the Wood firm. The Leaves are short and indented at the Edges, they are somewhat like those of the Elm, but of a more beautiful Green. The Flowers are small and inconsiderable. They hang in Catkins like those of the Hazel; and the Fruit, which is dry and light, grows on a different Part of the Tree.

There are four Kinds of this Tree raised in Nurseries. 1. The common Horn Beam. 2. The Hop Horn Beam. 3. The flowering Horn Beam; and, 4. The Horn Beam with striped Leaves: but the Husbandman who would plant for Advantage, has nothing to do with any of these except the common Kind.

The Horn Beam is an extremely hardy Tree, it will grow in the worst Soil and bleakest Situation. For this Reason it is very proper to be planted on the Tops of cold Hills, and in Places so exposed, that other Trees will not grow on them. It will thrive very well in Hedges, and in Woods; and is excellent for Clumps in the bleakest and worst Parts of Parks, and it every where engages the Eye by its Beauty.

The best Way of propagating the Horn Beam is by Layers, the Directions for which are laid down under the Article Elm. It may also be raised from Seeds, but this is a more tedious Method, and the other does as well. If the Seeds are prefer'd, they must be gather'd in SEPTEMBER, and sown three Weeks or a Month after, laying them in the mean time in a dry airy Place. They will sometimes come up in five or six Months, sometimes they will lie till the



the following Spring. They are to be thin'd soon after they appear, and kept clear of Weeds, and at two Years old to be removed to another Part of the Nursery, where they must be planted at a greater Distance, and three or four Years after they are to be finally removed, and set where they are to remain. But the Method by Layers is much more expeditious, and the Trees grow as beautiful that Way as the other.

The Horn Beam is very fit to be raised for the Garden as well as Field; for scarce any Tree makes a more beautiful Hedge. When it is intended for this Use, the Side Shoots are to be left on, and it is to be train'd up flat; but when planted for Timber, it should be trim'd up that it may grow with a good Trunk. The Hop Horn Beam is better for the Garden than the common Kind, because this does not drop its dead Leaves so readily, but they hang on in Winter, and are an ill Sight; but the common Kind is best otherwise. Its Use in Hedges is very great, because it bears clipping, rises to a great Height in a moderate Time, and will be thick and close at the Bottom when it is twenty Foot high in the Hedge. It roots also very firmly, so that it stands the Force of Winds; and is a fine Shelter to the other Growths.

Its Leaves, beside their Beauty both in Shape and Colour, have this Advantage over most others, that they appear earlier in Spring, and continue longer green in Autumn. One of the greatest Beauties of the Gardens at VERSAILLES, is the Height, Beauty, and Regularity of the Horn Beam Hedges.

The Farmer will find his Account in it whether he plant it in Hedges, in Coppice Woods, or on waste Grounds; and whether he train it up for a Trunk, or cut it for Shrowding. In general he should carry it up for Timber in his better Soils, and shrowd it where the Ground is very poor. In this Case the Branches shoot very quick, and afford good Fuel; and the Trunk cut down at a proper Time, useful Timber. In Coppice Woods it succeeds very well, and bears the dropping of the Trees left for Timber better than most others.

The small Wood of the Horn Beam is good for Fuel, and makes an excellent Kind of Charcoal. The Timber is of a pale Colour, firm and strong; but harsh, and of an uneven Grain. It is employ'd for many Purposes where Strength is requir'd, more than Beauty. Nothing is better for Mill Coggs; the Heads of Beetles and Mallets are also made of it; and the Turners use it sometimes for the stronger and coarser Kinds of their Ware. The worser Parts of the large Wood split make excellent Billetting, burning pleasantly and lasting.

#### C H A P. XLIV.

##### *O f the Maple.*

**T**HE Smallness of the Maple does not prevent it from being a very valuable, as well as a beautiful Tree; and 'tis a Wonder that more Notice is not taken of it by those who have any regard to planting.

The Tree we call the Sycamore, as already observ'd, is only a large Kind of Maple; and this which we call by the Name of Maple, resembles it accordingly in Flowers and Seeds; and, in some Degree, even in the Leaves. The Bark of the Maple is brownish and very rough: the Leaves are broad and deeply divided at the Ends. The Flowers are small and inconsiderable, and the Fruit resembles that of the Sycamore, being a Kind of Keys, only smaller and fewer in a Bunch.

In the Nurseries they raise several foreign Kinds of Maple, as the NORWAY and VIRGINIAN Sorts; but the ENGLISH Planter has no Occasion to regard any except the common Kind, which is frequent in Hedges, and is very worthy of his Care to make it more universal.

The best Soil for the Maple is a good vegetable Mould, or mellow Earth, with some Admixture of Sand, for it does not thrive either in too tough or too light Soils: but it will live in almost any. The Situation that most favours its Growth, is a little Elevation. In Hedge Rows on the Sides of Hills in a good Mould, we see the Maple very luxuriant. But tho' the Hedges are its common Situation, it will live very well in Coppices and Woods, and, with Care, may be brought to a much greater Value than it usually is.

The Maple is best raised from Seed, for it grows freely, and bears transplanting. The Keys are to be gather'd when perfectly ripe; and it is best to pick them from the largest and most flourishing Trees. They are to be spread upon the Floor of a dry airy Room for eight or ten Days, and after that sown. Any waste Piece of Ground does for a Nursery, the poorer the better; and they are to be sown pretty thick in Trenches, drawn across the Ground at small Distances, and lightly cover'd with the Mould.

They will shoot up early the next Spring, and require very little Care afterwards. At a Year and half old they must be planted out at two Foot Distance, and three Years after that is a good Time to remove them to the Places where they are to stand.

We have already named the most favourable Soil and Situation for it; but the Planter needs not stint himself to that singly. Let him avoid wet Places, and for the rest he cannot do much amiss, Chalk, Sand or Gravel will feed the Maple; only let him observe that in these poorer Soils, he must not expect it to grow to any Size. When he has a right Soil and Situation, let him train it up to a Tree.

To this Purpose when it is removed into the Place where it is to stand, let him take off all large Side Shoots, leaving only a Head and a few little Branches to draw up and detain the Sap in the Trunk. Thus trimming it up for a Tree, he will bring it to better Form than it is commonly supposed capable of, and will greatly increase its Value.

He is never to shrowd the Maple, or favour its spreading, for the Droppings from it are hurtful to all Things; and particularly a clammy Dew that gathers upon it.

The Maple is but a slow growing Tree; but it makes Amends in the Beauty of the Timber,

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the finer Pieces of which are of considerable Value. Its Keys make a pretty Appearance when ripe, and it would, for that Reason, have a Place in Gardens, but that the foreign Kinds have the Preference.

The Wood of the Maple is of a close and beautiful Grain: it cuts easily, and has a Firmness that holds it together in small Works, whence it is greatly valued by the Turners and Carvers. And when it happens to be vein'd, as is frequently the Case, it is used for fine Works by the Cabinet-makers, and in inlaying, it is then called the curl'd Maple, and Peacock-tail Maple.

They make Gun Stocks, and sometimes Knife Handles of it; and it is turned into Cups, Spoons, Trenchers, and Dishes, all very beautiful.

The Timber of the Pollard Maple is most apt to be curl'd and variegated; but it grows hollow very soon in this Form, and there is no depending upon its Soundness, except when 'tis carried up to a standard Tree. In Hedges it is brittle, but it will grow after breaking or cutting, if but the smallest Piece remain with any Bark upon it.

The Maple Wood has heretofore born a great Price, but the Use of foreign Woods has let down its Credit: the ROMANS held it next in value to the Cedar. The knotty Parts of the Tree are most beautifully vein'd; and what is called by our Cabinet-makers FRENCH Maple, is no other than the irregular growing Parts of the Trunk of an old Maple, that happens to keep sound. That Part of the Wood which grows near the Root of an old Tree is also very beautiful: and sometimes there stand out large Knots from the Surface of the Trunk, which, when cut through and well polished, have a most elegant Variety of Veins and Marblings.

The NORWAY Maple is so hardy that it may be cultivated here without Difficulty, and it will be easier rais'd to a large Tree than our common Kind: but its Wood has not that Excellence. In Appearance this more resembles the Scycamore than the common Maple; and it has an Advantage over it for Plantations near Houses, that the Leaves remain more entire. The sweet Juice that gathers about Sycamore Leaves entices Insects, which eat them to Pieces, but the Leaves of the NORWAY Maple are ill-tasted and therefore escape.

In some Parts of NORTH AMERICA, they make Sugar from the Juice of the Maple: and the same has been done here from the Juice of the Sycamore, which, as before said, is only a large Maple: it has been try'd and found to yield it in large Quantity.

#### CHAP. XLV.

##### *Of the Cherry Tree.*

THE Cherry Tree, though cultivated in general for its Fruit, is not to be despis'd on Account of its Timber; and might be worth planting alone for that, were there no other Advantage attending it. It is a large and tolerably well growing Tree, when carried up to an Height

by trimming; though the usual Intent of raising it being for the Fruit, it generally is made to spread into Branches.

The Bark of the Cherry Tree is brown, and tolerably smooth; the Leaves are large, longish, and shining, the Flowers are large and white, or redish, and the Fruit is round, or nearly of that Shape, with a Kernel included in a hard Stone. We have a great many Kinds of Cherry, but there are two principal, the black and the red; and to one or other of these all the other Sorts are to be refer'd; the black Cherry being small and the red large. The Heart Cherry is of the red Kind, and the Variety of others nam'd from the Fancy of Gardiners and Nursery-men do not deserve the Notice of the Husbandman, who means to plant the Cherry as a Timber, as well as Fruit Tree.

The black Cherry naturally rises to a tall and well-shaped Tree, and the red may be brought to it: and these may be rais'd without any particular Trouble, and will yield Profit enough to the Planter. The others require all the Arts of the Gardiner; and we should carry the Farmer out of his Way to lead him to them. All those fine Kinds are cultivated by budding or grafting them into the wild black or red Cherry Stock; and the Gardiners tell us this is because those are free Shooters; this is enough to shew the Husbandman that it is his Interest to plant them: for the free shooting, and quick Growth of a Tree are to him Articles of the greatest Consequence.

The best Soil for the Cherry is a Loam; this Tree does not require a rich Earth, but it will not bear the two Extrems of Clay or Sand. In the clayey Soils its Roots are starv'd, and in the sandy they are burnt up, but on any other Ground it will grow very freely. Too much Dryness or too much Moisture are equally Enemies to the Cherry Tree. But it will stand and grow to Timber under many of these Disadvantages, though they affect the Fruit.

The Cherry will grow in any Situation, but it does not thrive well when too much exposed, as on the Tops of bleak Hills. It is observed to shoot the quickest, and arrive at its Bigness soonest, in Soils where there is a good Degree of Moisture; but the Timber is most valuable where it has grown on a dryer Ground.

The Cherry is to be propagated by sowing; and the best and most advantageous Kind is the black. The Stones should be saved from some of the best Fruit of a large and tall Tree, and us'd soon after they are gathered; they should be sown in a Piece of poor Ground, in Trenches, and covered two Inches and an half with the Mould. When they shoot, the young Trees are to be thinn'd, and kept clear from Weeds, and at a Year's Growth they should be removed into a larger Bed, and planted at eighteen Inches Distance, in Rows two Foot and an half asunder. Thus they are to stand till they are large enough to remove into their proper Places.

They may be planted in Hedge Rows, Orchards, Parks, or Warrens, and the proper Distance is about five and thirty Foot; the best Way is in Rows, and these should be forty Foot asunder. Thus they may be train'd up to useful Trees of



Timber, and at the same Time afford a constant Profit from the Fruit.

The Cherry Trees in many Parts of ENGLAND stand in the Hedges, and where the Property is secured by Custom it is a very good Method; but in Places where idle People will make free with the Fruit, they will be broke to Pieces in the gathering it; and the Hedges spoiled all about.

It is better, in these Places, to plant a poor Field with them by way of Orchard, and the Ground may be tilled between them, especially while they are young, as much as if it were clear. The only necessary Caution in such a Plantation is, that it be defended from westerly Winds, for they are always hurtful to this Tree. The more the Trees are carried up for Timber, the longer the Ground may be tilled between them; for when they are suffer'd to spread at a small Height, as is usually done when they are planted only for Fruit, they soon shadow the whole Ground, and injure the Growth of any thing sown upon it by their Drippings.

There is this farther Reason for carrying the Cherry Tree up for Timber at present, that the Fruit bears so small a Price it scarce pays the Charges of gathering in a bad Year; and affords very little Profit even in the most favourable.

Both the black and the red Cherry, properly train'd up for Timber, by cutting off the young Branches that would spread too much, and carrying the Tree to a Top, will grow large, regular, and beautiful. They make a very good Appearance in Avenues, and other regular Plantations, when rais'd for that Purpose; for though the Cherry in Orchards is a very ill looking Tree, this is not so much in its own Nature, as the Manner of cultivating it. A well grown Cherry when in Blossom, makes an elegant Appearance, as also when in Fruit, where these are suffer'd to hang undisturbed.

One thing is very essential in the preparing the Cherry Tree for Timber. When it is transplanted from the Nursery, the usual Way is to cut off the large down-right Roots: this is right when it is rais'd for the Fruit, because it prevents the Trees rising in Height, and makes it spread into Branches: but just the contrary of this is the Design when the Cherry Tree is rais'd for Timber; and therefore the long Root is, in this Case, to be left entire at the Removal, and the top Shoot never shorten'd or injur'd.

Those who want only a few Trees may raise them from Suckers, which grow in Plenty about the Roots of the old ones, but it is a much better Way to sow the Stones, and the Trees are always the fairer.

We are accustomed to see certain Kinds of Cherries cultivated in certain Places, and some have supposed they thrive particularly there; but there is nothing more in this, than that Custom has become the Law of the Husbandman; and he plants the Kind he sees planted by his Neighbours. Red Cherries are cultivated in KENT in such Plenty, that they have obtained a Name from the Place; and in the same Manner black Cherries seem peculiar, in a Manner, to HERTFORDSHIRE. But I have seen as good black Cherries in KENT as in that County; and have

eaten KENTISH Cherries in HERTFORDSHIRE as good, and from as fair and flourishing Trees, as any in the Country from which they are named.

The red Cherry requires a somewhat richer Soil than the black; and the Husbandman who intends to raise these Trees should guide himself accordingly; not planting black because in one County, or red because he happens to live in another; but the red if his Soil be better, the black if it be worse.

The Season for felling the Cherry Tree is about the Middle of NOVEMBER; and it is proper to observe this punctually, because a great deal of the Value of the Timber depends upon its being cut at a proper Time.

The Woods of the red and black Cherry are very much alike, but that of the black is finest, and the Tree is more free to grow strait, tall, and upright. This Timber is not only valuable for its Beauty but its Strength. It will grow to such an Height and Thickness in the Trunk, that it will afford good Beams for building; and Experience has shewn that they are equal to any Timber, except the Oak, in their Strength and lasting. And it is fit for the Cabinet-maker as well as the Carpenter.

Of all the EUROPEAN Woods there is none that so much resembles Mahogany, as the Timber from the Trunk of a good sound black Cherry Tree. We are sensible that at this Time these Trees are rarely rais'd for this Purpose; and that what is called Cherry Tree Wood is cut from the red or black Cherry indifferently, and just as it happens a Tree has been cut down; but even under these Disadvantages Chairs and Tables are made of it, which have an Appearance of that Wood. It is certain the Resemblance might be brought much nearer by proper Care.

Mahogany itself is not of that beautiful Colour when first cut. Time gives it the greatest Beauty, and when it is fresh wrought into Cabinet-work, they rub it with several Things to stain it. They use particularly for this Purpose, a red Earth, that is dug in the Isle of WIGHT: from the Colour it gets by this, and well oiling, it by Degrees becomes of that beautiful Hue we so much admire. Now let a Piece of Timber from the sound Trunk of a black Cherry Tree be wrought in the same Manner, be rub'd with the same red Earth, and oil'd as the Mahogany is, and I am of Opinion, if not equal, it would be found very nearly equal in Beauty.

Now is it not worth the Planter's while to raise a Tree which will be next to the Oak in Strength, and next to the Mahogany in Beauty?

If the Size of the Timber should be objected, it must be by those who have not much observed the Tree: I have seen black Cherry Trees in the Hedges in some Parts of HERTFORDSHIRE, of a fine Thickness and Height in the Trunk; and when it shall become an Article of Husbandry to raise it for the Timber, doubtless we shall see it much larger and finer. There is nothing in Nature to prevent it; most of the Form of Trees is owing to the Management of them when young.

The Cherry Tree will grow among other Forest Trees in Woods, as well as any Kind, and though it bear little Fruit this Way, it will rise strait, and

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with a tall Trunk; nor is any Tree fitter to be mixed among Coppice Woods, for it grows very freely, and when thus carried up in Height does little Hurt by its Shade. The Boughs are good for Fuel, and it will answer many of the other Purposes of Coppice.

In fine, the Reason why the Cherry Tree has not been so much regarded as it ought as a Timber Tree is, that it is understood to be of the Fruit Tree Kind: but hereafter, I hope, we shall see it rais'd on the other Account, in which it is more valuable.

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#### C H A P. XLVI.

##### *Of the Pear Tree.*

**A**FTER the Cherry it may be proper to mention another which is so generally looked upon as a Fruit, that it is rarely considered as a Timber Tree, although its Wood is, in many Instances, superior to any other in the World. This is the Pear Tree, which I hope to remove from the Orchard to the Hedge, and to shew the Husbandman that he has as much Reason to value what is called the worst Kind, as the Gardiner has to prize the best.

The Pear Tree, when properly managed, is a large, tall, and well growing Tree. The Bark is rough, the Leaves are roundish, and the Flowers resemble Apple Blossoms, but they are whiter. The Fruit is sufficiently known. It is naturally small, longish, and larger at the End farthest from the Stalk. Art has brought in a Multitude of Varieties of Tastes, Colours, and Names of Pears, but the Husbandman has nothing to do with any of these. He is to consider the Tree for its Timber, and the only Kind that should be planted for that Purpose is the common Choak Pear, called in some Places the wild Pear: this is the Kind from which all the rest have been produced by Culture; and is that of which, when least improved, Perry is made. This grows freely in Hedges, and will easily be train'd up for Timber.

The Pear Tree will grow in any Soil, and there is scarce any in which it will not thrive. It bears a moderate Degree of Moisture, without any Injury, and only grows the quicker for it; but too much will destroy it, and hurt the Timber before any visible Sign of Decay appears on the Leaves or Branches.

It will grow as well on flat Ground as the Sides of Hills, but does best where there is a Depth of Soil. The Pear Tree is best rais'd from Seeds. And for this Purpose the Husbandman is to mark a fair and upright Tree, and gather the Fruit just when full ripe. A poor Piece of Ground is to be chosen for a Nursery, and the Trees are to be rais'd and train'd up, as directed for the Cherry. Only taking great Care on the last Removal, not to injure the main Root.

The Pear Tree thus rais'd will grow to a considerable Height, with a strait and single Trunk, before it begins to bear any Fruit; but when it has once began, the Produce will be yearly very great; and the Fruit, though but poor in Taste, will yield a great Profit, if made into Perry, which

is very easily done; as shall be shewn hereafter; for the Vintners and Wine Coopers are always ready to take it off in any Quantity.

It is strange that this single Circumstance has not led People more into the propagating this Tree; for the Quantity sent up to LONDON was never yet enough for the Demand.

While these Trees are thus enriching their Owner yearly by their Fruit, they will be all the Time growing up to Timber. A proper Supply of young ones should be planted against the Time of felling, that they may yield Fruit for Perry when the others are gone. If these Trees are planted in Hedge Rows, forty Foot is a good Distance; and four or five Years before the old ones are to be fell'd, there should be brought a Supply of Trees of about six Years Growth from the Nursery, and planted at every forty Foot, as the others, one between each Couple of the old ones.

The old Trees, when fell'd, should be stub'd up, and from this Time the young ones will flourish and bear surprizingly.

The Timber of the Pear Tree is of a delicate fine Grain. It cuts easily, and takes a beautiful Polish. It is equal to any for the finest Works of the Turner; and the Carvers are with Reason very fond of it. It is also in some Places, wrought into Tables, Chairs, and other Furniture. In the Beauty of its Colour, Closeness and Evenness of Grain, and yielding to all Instruments in working, it is superior to any Wood whatsoever. There is at present a very certain Market for it; but if the Supply were greater the Demand for it would rise in Proportion, for it would then take the Place of many other the fine Woods.

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#### C H A P. XLVII.

##### *Of the Hazel.*

**W**E now come to the Consideration of a Tree of small Stature, but being a Fruit Tree it properly follows the others of that Kind, and notwithstanding its Smallness it has sufficient Value to make it worth the careful Husbandman's while to look upon it with Regard to Profit.

The Hazel is a low Shrub with broad indented Leaves, and a brown tolerably smooth Bark. The Flowers are in a Kind of Catkins. The Fruit is well known, it grows in a different Part of the Tree from the Flowers, and usually in Clusters of three or four together.

The Filberd is the Hazel improved and enlarged by Culture; and beside this we meet with two or three other Kinds among the Nurserymen. There is first, the little white Nut Hazel; secondly, the great or Cob-Nut Hazel; thirdly, the red Filberd; fourthly, the white Filberd; and lastly, the great Spanish Nut, which is angulated on the Surface. These have been only rais'd from the common Hazel, and are not worth the Husbandman's Regard, he is to stick to the natural wild Shrub, leaving these to the Nurserymen and Gardiners.

The Hazel is a stout and hardy Shrub, it will grow on the poorest Soils, and stand in all Exposures.



posures. This is a great Article of its Value, for it will succeed where many other Trees would altogether fail. It will grow in the toughest or the loofest Soils; in Clay, and in Sand; and flourishes very well in stony Grounds. But the Soil and Situation that suit most perfectly with it, are a fresh light Earth, on the Side of a Hill, especially if not too shallow.

Many propagate the Hazel from Suckers, which they are tempted to do by the great Abundance of them that it produces; and by the Freedom with which they take Root: but the best Method is from Seed, and this is so easy, that 'tis not worth while to take any other.

To this Purpose let the Husbandman gather a good Quantity of Nuts when they are thoroughly ripe, from the most flourishing Trees. Let a Bed of Sand be spread upon the Floor of some cool Room, and these Nuts laid on it, covering them with a little more dry Sand; and thus they are to lie the whole Winter. In FEBRUARY they are to be sown in Trenches, in a poor Ground, and transplanted when they are of two Years Growth. They are to stand a Couple of Years in their new Place, and then to be removed to the Hedge Rows, or elsewhere, where they are to remain.

When a Coppice is raised from Seed, the Nuts may be sown among the rest, but it may be thicken'd afterwards by transplanting more of them into it.

The Nurserymen and Gardiners propagate their Filberds by Layers; but though this may be the best Way, when they are raised for the Sake of the Fruit; the sowing them is best for other Purposes.

After they are removed to the Places where they are to stand, they must be cut down within five Inches of the Ground: if they are pretty large when they are removed, this may be done the first Year; but if smaller, it is better let alone till the second.

When they are planted in Coppices, they are fit to fell with the rest of the Growth, at twelve or thirteen Years old; and, after the first cutting, they may stand seven or eight Years.

No Shrub answers better for the thickening of a Coppice, by laying down a Branch, than the Hazel. One long Pole chop'd half through near the Ground, and cover'd for its whole Length five or six Inches deep with Earth, fastening it down with a Peg, will yield a Row of fine Shoots.

The Hazel, when cut at ten or twelve Years Growth, yields a very good Price. It is esteemed by the Hoop-makers, and on many other Occasions; and, in some Parts of ENGLAND, is raised singly in very large Plantations for this Service. Its Fruit are a very great Disadvantage, for they occasion its being broke and torn to pieces by Boys, before it is in a Condition to cut; and this is a great Reason against planting the Hazel in Hedge Rows, where else it would thrive very well and grow to use. Not that it is by any Means a good Shrub for the serviceable Parts of a Hedge, for it does not grow close, nor does it bear plaining: it also wants Thorns for the Purpose of keeping off Cattle.

'Tis best to raise it singly in Plantations for

the Hoop-makers, or among Coppice Wood. Beside the Hoop-maker, it is used by the Thatcher, for the making of Hurdles, and on many other such Occasions. Its fine taper Shoots are used for fishing Rods, and the worst of it is very good for faggoting.

The small Branches of the Hazel burn to a fine light Kind of Charcoal, and are, in some Places, used for the making Gun Powder. The Chips of Hazel Wood are also used by the Wine Coopers, and are a very harmless Ingredient for the fining of Wines.

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## C H A P. XLVIII.

### *Of the Buckthorn.*

FROM the Hazel we shall advance to another Shrub, whose Fruit is of Value; the Buckthorn. It is indeed of so much Value, that one is surprized the Husbandman should not think it worth his while to give the Shrub a Place in his Hedges; for it will, in a tolerable Soil, grow as freely there as any other Kind; and answer the Purpose of fencing better than many that are constantly planted there merely from Custom, and without any particular Reason, or any tolerable Use.

The Buckthorn is a Shrub of ten or twelve Foot high, the Bark is brown and smooth, the Leaves are oblong, and the Flowers are small. The Fruit is a Berry, roundish, black when ripe, and juicy, containing four hard Seeds, which are rounded on one Side, and flatted on the other.

This Description of the Berry admits of no Mistake in the Shrub, for if any one should at random think to raise it from Berries bought at the Markets, he might be strangely disappointed; as the People who gather it frequently, though very dishonestly, bring the Berries of the black Alder, and some other Shrubs among them: the Berries of the black Alder most resemble them, but there are only two Seeds in each of these.

The Buckthorn Shrub loves a light and rich Soil. We see it in Hedges on other Kinds of Ground, but it does not flourish when it has not free Room to spread its Roots, and Plenty of Nourishment. For Situation, a Flat toward the Bottom of a Hill is the best; but there is no need to be very strict in these Things: it may be planted among the Quick of a Hedge any where; only if there be Choice of Soils and Situations, it will bear its Fruit more plentifully and constantly, and it will ripen it better on these just named than on others.

Buckthorn is to be propagated by sowing. And for this Purpose the Berries should be gathered from a thriving Tree late in Autumn, when they are thorough ripe; and sown immediately in shallow Trenches, in a Bed of a loamy and light Soil.

When the young Trees first appear, they should be water'd a little, if the Season be dry, and kept clear of Weeds; after this they should be treated exactly in the Manner of the Sloe or black Thorn Plant, as described already in their Place;



Place; and planted with the Quick on the Bank in making of the Hedge; where they will grow up with the rest. One Plant of Buckthorn may be set at every fifteenth of Quick, and the Hedge will not be at all the worse for it.

The Stem of the Buckthorn will grow to the common Bigness of the Hedge Wood, and when cut in the plaishing and new making the Hedge, will answer the usual Purposes, and in the mean time every Year there will be a great Quantity of the Berries which sell at a very considerable Price. The Apothecaries buy them to make a purging Syrup, which has its Name from the Shrub.



## CHAP. XLIX.

### *Of the Alder.*

**T**HE Alder has been occasionally mentioned in the preceding Book, as useful for defending a mellow Shore from being undermined by the Stream of a River: but we are here to enquire more at large into its Nature, and after that, shall speak of several other of those Trees that grow in wet Places.

I have mention'd in the last Chapter, a Shrub called the black Alder, whose Berries are often mix'd among those of Buckthorn at the Markets: but that is a little Shrub no way allied to the right Alder, except in the Shape of the Leaf, from whence careless People, not regarding the more essential Characters of either, called it by the same Name.

The Alder properly so called, is as commonly rais'd a very large Shrub, consisting of a great Number of tall and thick Shoots rising from one common Stump; but it may be rais'd singly, and in Form of a Tree; and will acquire a very considerable Bigness. The Bark is smooth, and of a dark purplish brown Colour; the Leaves are large and roundish, and usually feel clammy: the Flower is in a Catkin in the Manner of the Hazel; and the Fruit is a small light Cone produced on a different Part of the Tree, and seldom much regarded.

The proper Soil for the Alder is a rich black Mould; and its proper Situation is in a Flat, near the Edge of some little River: it thrives particularly in half boggy Places, where the Water every now and then floats the Ground, and lies some time upon it. The little Rivers of Buckinghamshire and Hertfordshire, that run through rich Meadows, have a large Quantity of fine Alders upon their Banks; and wherever they overflow frequently, the same Trees rise from the Spreadings of the Roots of the adjoining ones in great Abundance.

The great Benefit of this Tree to the Farmer is, that it will live and thrive in such Places as will not agree with any other Kinds; and if such Grounds were universally planted with it, it would be of great Benefit to the Owners, as there is a constant Demand for the Timber, though at a small Price.

The Propagation of the Alder is extremely easy, for the raising it in the usual Manner in

Clumps of Poles; but a little more Care is requir'd in propagating it for a Tree, and 'tis very well worth while to take it.

The Alder will rise from sowing the little Cone or Fruit, but this is a tedious Way. The common Method is to cut the Poles into Truncheons of a Yard long, and set these in the Ground in a rich wet Earth. They will grow as readily as the Willow or Elder; and thus naturally send up a great many Shoots, which is the common Intention in the planting them.

The Truncheons are to be planted in the Beginning of APRIL. Some cut them immediately for that Purpose; others cut them in OCTOBER, and tying them in Bundles, leave them with the larger End in Water all Winter, and then plant them in Spring. This they do to make sure of their growing, but it is an unnecessary Trouble: they generally strike Root very freely; and if there be any Doubt, 'tis but planting some spare ones, and those which do not take may be pulled up.

Another Method is to plant a Piece of the Root of an Alder deep in the Mud crosswise, that a Tree may rise from it, and this deep laying in of the Root secures it from Injury by Winds. Others bury a long Pole of Alder, cutting off both Ends, and it will shoot up many Branches, which are to be cut off near the Ground, and then left to shoot afresh in Numbers from each Place where they were cut.

But though all these Methods are not only recommended, and frequently used with Success, I shall advise a Husbandman to a Course quite different from them all; which is, to raise the Alder from Layers, in the Manner as described under the Article Elm: for no Tree whatsoever takes in this Method more freely. The Shoots taking Root immediately, and bearing transplanting excellently.

The Nursery for this Purpose must be in some wet Place by a River Side, where a few Stools of Alder will afford a continual Supply. At a Year after the laying, the Shoots are to be taken off and transplanted. To this Purpose let there be a Number of Holes dug at seven Foot Distance every Way to receive them. These Holes must be two Foot deep: the young Trees must be taken up carefully, and planted at least a Foot and half deep upon some loose Mould in the Bottom of the Hole, and the Earth well put in about them. Every Shoot will thus grow, and no Method is so certain or so advantageous.

One Year after they are planted let the Owner go over them, and take Notice which are the finest, strongest and straightest Shoots; these are to remain as they stand, but the weaker he is to cut down within about six Inches of the Ground. The Number to be left for Trees should be nearly half, and the others will shoot up from the cutting in long and strait Poles in the usual Way. Thus he will have a Parcel of Alders rising up to Trees, so far as their Nature will bear, and another Parcel of the usual Kind, which are to be felled as common Alders, while the others remain like the Timber Trees in a Coppice, increasing in



in Bigness and Value, and standing throughout several Cuttings of the smaller.

Alders growing in the common Way, are to be cut once in four Years. For they are a very quick growing Tree; the Wood being light, and there being Plenty of Moisture for it, which is the great Support of all Growths.

The Bark of the Alder was at one Time in Use among the Dyers for black, but at present it is little regarded. While it was used to this Purpose, the Time of felling the Alder was in Spring, because the Bark then came off easy. At present 'tis felled in NOVEMBER and DECEMBER, and the Wood is found of a greater Firmness than it used to be when cut in the Sap Season.

It is, however, proper to bark the larger and better Pieces of the Alder wheresoever they are cut, tho' the Bark be not used for any Thing; for there are apt to breed Worms under the Bark which destroy the Timber, but it is seldom hurt by them when the Bark is off.

No Tree grows quicker than the Alder, nor does any of the soft Wood Kinds make a better Return in Profit; 'tis therefore a Wonder it should be any where neglected where there is Ground that is fit for it. The Farmer always finds Purchasers at a better Price for his old over-grown Alders, as they are called: therefore why will he not raise a Quantity of good Trees to such a Size.

The Uses of the Alder are many. The smaller Poles make Hurdles and Gates as well as any Wood whatsoever; and of the larger Pieces, Chairs, Country Utensils of many Kinds, and Clogs and Shoe Heels are made, and a great Number of other Things that require a light and yet firm Wood.

It bears to lie wet as well as any Wood whatsoever, but then it must be always in Water, for if it be sometimes dry and at other Times wet, it perishes quickly. We read in the old LATIN Authors, that the Alder was made the Foundation of Bridges, and other Buildings in boggy Grounds: and it stands upon Record that there is a great deal of Alder used under our old Bridge at LONDON, and under the Rialto at VENICE.

There are those who say Alder hardens by Degrees under Water, till it becomes a Kind of Stone, but this is false. It is sufficient that it will last a vast while on these Occasions; and it is plain from hence, that if a Supply of large Alder could be had for such Works as are to remain under Water, there would be a sufficient Demand for it: and this may be done on the Methods here laid down.

The Alder serves excellently for Piles of all Kinds, driven under Water; and Faggots of this Wood are excellent for laying in Trenches, cut through boggy Grounds to prevent their filling up. The Poles sell well to the Hop Planters, and the small Branches make an excellent Charcoal for Gun Powder.

The great Consumption of the large and sound Timber would be among the Turners. It is a very firm and light Wood, so that the Bowls, Dishes, and the like made from it, would be preferable in that Respect to those of

Beech, and smoother and handsomer than those of Elm, which are always harsh and ragged.

There is a Toughness in sound Alder that will make it bear turning very thin; and it is worth the Consideration of the Carver; answering freely to his Chissel, and yet holding together in very fine and small Work.

A Plantation of Alder, beside the Ease with which it is made; and its Readiness to flourish where other Trees will not grow, has this Advantage, that the Leaves and young Shoots are so ill tasted, no Creature will crop them. So that it needs no Trouble or Expence in fencing.

I have named all these Advantages of the Alder, that more may be tempted to plant it than do at present. I have seen many a large Piece of Ground left waste, on which Alders would thrive perfectly well; and which would by such planting bring a vast Profit to the Owner.



CHAP. L.  
*Of the Willow.*

THE Willow is another of the watery Trees, which, although frequent enough in some Places, is not nearly so much cultivated as it might be; and which, under a better Management than is generally bestow'd upon it at present, would yield very great Advantages to the Owner.

The Willow, when the right Kind is chosen, and right Management is given it, grows to a considerably large and tall Tree. The Bark is pale colour'd, rough and cracked; the Wood light and whitish: the Leaves are long and narrow. The Flowers are small, thready, and form'd into a Kind of Spike: the Fruit grows on other Trees of the same Kind, and contains a downy Seed.

There are several Kinds of Willow; but few of them are worth the Husbandman's Notice, or Consideration: the Ozier and the Sallow are properly of the Willow Kind, but these differing from the common Willow in many Respects, shall be treated of in separate Chapters hereafter. Among the other Kinds the common tall Willow, or white Willow, which freely and naturally rises into a Tree, and which the Farmers in some Places distinguish by the Name of the withy, is the principal in Value. Next to this is the large leav'd green Willow, which is generally kept a Pollard. And the others being all inferior to these two in Growth and Value of the Wood, are to be neglected.

The proper and natural Soil of the Willow is a damp rich Earth: near Waters, and in flat Grounds, is its favourite Situation. Of the two Kinds just mention'd, the white leav'd Willow, which naturally grows into a Tree, will do with least Moisture: the other, or green leav'd Kind, which is best kept for shrowding, loves the wettest Places. Let the Farmer keep this in his Remembrance always: for on these careful Distinctions, and the exact suiting of the Soil to the Kind of Tree, depends in a very great Degree,



Degree, the Advantage of one Person over another in his Plantations.

The Willow, of which ever Kind it is, is a Tree very easily propagated; for it will take Root in any Form, and under any Manner of planting whatsoever; and will thrive wherever there is Water. The white Willow will do even where there is but a moderate Quantity of Moisture. It will thrive in clayey and loamy Soils, and will often rise to a considerable Stature in Hedges, and on waste Grounds, that are very far from any Water.

The common Way of propagating the Willow of either Kind is by cutting Poles of ten Foot long: these are to be struck off one Way at the Bottom, and thrust two Foot and a half deep into the Ground in moist Places. This is so easy and expeditious a Method, that few will ever be led to think of practising any other: and indeed none is better for the green Willow, which is intended for a Pollard, because a little Advance in Height gives it the proper Length of Trunk, and the Shrowds naturally grow from the Top. But for raising Trees of the white Willow, or Withy, I altogether prefer the Method by Layers. These are procured with the greatest Ease, in the Manner directed under the Article Elm, only chusing a wet Piece of Ground for the Stools; and being afterwards planted in deep Holes, as directed for the Alder, they take firm Root, and grow up with a surprizing Quickness. When these Trees stand on a moderately dry Soil, they quickly rise to a sound and good Timber, consisting of a large Blea, and a redish Heart, which is firm and beautiful, and bears a tolerable Price.

The best Time of planting the Willow is toward the End of FEBRUARY: and if the common Method by Poles or Truncheons be used, it will be proper to let them stand with the End in Water, that is to be thrust into the Ground four or five Days before they are planted. The Distance should be about fifteen Foot, and Care should be taken not to rub up the Bark in thrusting the Stake into the Ground. The Carelessness of the Planter in this Respect, has often prevented the Willows taking good Root, and this has been laid to the Charge of the Soil.

The common green Willow in the Pollard Form, is of so quick Growth in the Branches, that it may be cut once in four Years. The Season for this is NOVEMBER or FEBRUARY, and one is as well as the other. But as this Tree is of such speedy Growth, it is also of quick Decay, and this is to be provided against.

A Plantation of Pollard Willows should never be expected to stand longer than five and twenty Years; so that a fresh Supply should be raised against that Time, by planting new Stakes or Truncheons between; and the old ones should then be grub'd up while their Trunk is sound; for soon after that Time, and often before, from Damages and Accidents, it grows hollow, and moulders away into a Kind of Touch-wood.

The Mischief commonly begins at the Top, where the Wet gets in after cutting off the Shrowds, and so penetrates all the Way down.

The Pollard Trees of this Kind must be car-

ried to a Height above the Reach of Cattle, before they are suffer'd to shoot for a Head, for they are very fond of cropping the young Shoots of this, though none of them will touch the Alder.

When the white Willow, or as some call it, the red Willow, from the Redness of its Heart, is to be raised for a Tree, the usual Care is to be taken in trimming it up, to let no large Side Branches shoot; and to leave a few small ones to call up and detain the Sap in the Trunk: by this Means it will rise to a tall and well looking Tree.

This Kind, as well as the other, may be cut for shrowding, and either of them are of great Use this Way in Places where Fuel is scarce, for they yield a very great Quantity, and a quick Return. A Person who has but a moderate Number of them, by allotting them into four Divisions, and cutting one Part every Year, may have an annual Supply.

The Willow is of great Use also in Hedges in proper Soils. The Stakes being made of this Wood, will all grow, and at once continue firm, and thicken the Hedge.

The Wood answers many of the Purposes of the Alder, and many others; the Poles make Hurdles and Fences, and Withs for the tying up of Faggots. They are used by the Thatchers instead of Hazel; and they burn into an excellent light Charcoal. For Quantity it has been computed, that an Acre of Ground properly planted with Willow, will at eleven Years Growth yield a Hundred Load of Wood. The large Wood is used by the Turners, and when good, brings a considerable Price. The worst of it may be split out into billeting, and burns excellently.

When the Willow is raised in a Tree, and has a long and sound Trunk, it may be cut into Boards, and used in Building, for they are strong, of a good Grain, and very beautiful.

XX

## CHAP. LI.

### *Of the Ozier.*

THE Ozier is a small Kind of Willow; which from the particular Uses for which it is raised, requires a different Sort of Management, and another Manner of planting.

The Ozier very much resembles the Willow in its Appearance, but that is a smaller Tree, its Shoots are longer and slenderer, and its Leaves also much longer, these are very narrow, and in the best Kind are green on the upper Side, but whitish, and as it were, woolly underneath.

The Ozier loves a wet and low Ground, near Waters, and nearly upon a Level with the Water. It thrives no where so well as in marshy Places, near the Edges of large Rivers; or in those little Islands that are form'd by the breaking of their Current; and every Way surrounded by the Water. The Ground for an Ozier Bed should be a rich black Mould; and this is very common in these low and wet Situations.

The Design in planting the Ozier is, that it may shoot out a great Quantity of fine slender Twigs,



Twigs, which are to be cut at a small Growth. Therefore there is no Occasion for a Trunk either of the Pollard or Timber Tree Form. This would only exhaust a great deal of the Nourishment taken in by the Root, and deprive the Shoots of it; neither are they so apt to rise strait and fine, unless they begin near the Ground.

On this depends the peculiar Way of planting the Ozier. It is rais'd in the same Manner as the other Willows, by Truncheons or Stakes driven into the Ground; and it is proper always to let a certain Quantity of the Shoots stand for a due Growth for this Purpose, when the rest are cut. But as these are not to rise in a Trunk, they must not be above four Foot in length, and three Foot of this must be thrust into the Ground.

They will, by this Means, have a fine Supply of Roots; and beginning to shoot so near the Earth, all the Nourishment will be carried up into the Twigs.

These Stakes are to be planted at three Foot distance, and they will quickly yield a large Profit: the Twigs rise numerous from their Tops; and being cut down pretty close, in the Manner of shrowding Pollard Trees, they send up a new Set of Twigs again almost immediately, which quickly grow to their proper Size.

The Time of cutting Oziers is in SEPTEMBER; and the Advantage that may be made of planting them is very great. Many waste Pieces of wet Ground might be made to yield a great Profit by them.

If Stakes or Truncheons of a proper Bigness cannot be had, more Time will be requir'd to raise the Ozier Bed; but it may be done from smaller Sets. These are to be cut four or five Foot long, and stuck at the same Distances into the Ground. They will grow very freely; and when they have stood three Years they are to be cut down, within a Foot of the Ground; and from thence will rise the Twigs in great Abundance; and they will continue affording a Supply of them many Years.

The finest and best Kind of Ozier is that I have described with long Leaves, white underneath; but there are several others that answer the Purpose very well. The Twigs are of constant and ready Sale. The Basket-maker's Work depends upon them; and there is a great Consumption of them among the Fishermen. The Wheels, as they are called, for catching Eels and other Fish, are made of them: and Baskets, Hampers, and the like, of which the Consumption is, in a Manner, endless and unlimited.

The quick Growth of the Twigs is a great Article in the Profit of an Ozier Holt, for they are cut every Year; and the Heads that bear them grow for a long Time more and more bushy at every cutting. So that here is a vast Profit to be made with scarce any Expence; annually returned and increased every Year; and this upon Ground fit for nothing else; for the Ozier will grow and flourish on Ground that is so loose and so wet, that it would not afford Hold for the Root of any other Kind of Plantation whatsoever.

As the Stems of the Ozier will decay in Time, let the Husbandman always take Care to have a Supply. Nothing is so easy: for 'tis only sticking into the Ground some Twigs between the

Stems, which will take their Time to root themselves, and grow to a due Bigness; and when properly cut, and managed according to the Directions already given, of raising an Oser Ground from Sets, will be ready to yield their Produce as the old ones begin to decay; and may thus be made to supply their Place gradually as they are wanted.



## CHAP. LII.

### *Of the Sallow.*

THE Sallow is also properly a Kind of Willow, but so far different in its Cultivation and Use, that it very properly falls under Consideration in a distinct Chapter.

There are several Kinds of Sallow, as there are of Ozier; and all of them answer the same Purposes, in a more or less perfect Degree: but as I have mentioned which is the best Ozier, I shall, in the same Manner, acquaint the Husbandman that the Kind of Sallow which will best answer his Care in raising, is that which has a roundish Leaf, of a pale whitish green Colour, and rough. This is common in Hedges, and it is from this he will do best to raise his Stock.

The proper Soil of the Sallow is a rich black Earth, where there is a tolerable Degree of Moisture; and its most favourable Situation is in the damp Part of a Coppice, or in a Hedge Row in a flat Meadow, where there is a wet Ditch at the Bottom.

It is in these Places the Sallow rises to its greatest Perfection, but it is not confin'd to these, for it will grow in loamy or clayey Soils far from Water, and in almost any Situation.

The Advantage of planting the Sallow in its best and most favourable Soil is, that it grows very quick. It is an excellent Shrub to mix with white Thorn in Hedges, and in this Case it will be fit for cutting every four Years; so that it yields double the Wood of any other Kind in a Fence; and at the same Time improves and strengthens it in every Respect.

The Sallow may be propagated in the same Manner as the Willow and Ozier, by sticking Stakes or Truncheons of it into the Ground, which will grow without farther Trouble: but when it is set in a Hedge, the best Method is to plant the Sets with the white Thorn, and let them grow up together.

The Sets of Sallow may be planted on the opposite Side of the Bank from the white Thorn, of the Hedge; because they will be fit to cut before the white Thorn is half grown.

If Sets are not in readiness rais'd in the Manner of the white Thorn; Pieces of Sallow Twigs of a Yard long, and an Inch thick, may be let into the Bank slope-wise, at proper Distances; and they will grow very well. The best Method is to make an Hole with an Iron Crow, for if the Sallow Stake be thrust in of itself, the Bark is often injured, and it will not grow.

Chalk and Sand are the only Soils on which the Sallow will not thrive. A loamy Earth in the Neighbourhood of Water, will make it push at a great Rate: faster indeed than in pure Mould, because



because of the Warmth there is in the Sand, that is in this Kind of Soil, and the free Passage of the Water; but I have found by Experience, that the Wood is firmer and better when it grows on a good Mould.

The best Time for cutting the Sallow is early in Spring; for it then shoots out almost instantly on the cutting: and I am to advise the Husbandman to use some Care and Caution in the Manner of doing it. It is a common Complaint that Sallow Stumps are not lasting: if this were true the Objection would not be of any great Force, they are so easily supplied; but it is the careless or ignorant Manner of cutting, that makes them decay. If the Shoots are ill cut, their Ends left long and straggling, and haggled by a clumsy Workman, they will rot in wet and decay the Stumps: but let them be cut off close and smooth, and at a proper Season, and the Sallow shall last as long as the Thorn.

The Quantity of Wood produced by the Sallow is of great Advantage to the Farmer, because he always has it ready to make up, thicken and mend his Fences. The Poles of the Sallow are used to make Hurdles, and when they are larger they turn to yet better Account in making Rails, Rafters, and the like.

I have proposed to the Husbandman to raise the Alder into a Timber Tree, instead of letting it rise in Poles, as is the Custom; and the same Thing may be done with the Sallow.

Though we usually see it as a low Shrub, it may be raised from Layers, in the Manner already directed for the Alder, and trained up into a regular well-bodied Tree. In the damp Parts of the Woods it will grow among the other Timber. And Plants of it thus raised, may be left Standards in the felling of Coppices, while those that grow in the usual Way are cut with the rest.

The Sallow, thus raised to a Tree, affords a firm and very tough Wood, that splits easily with the Grain, and may be used on a great many Occasions in Country Building.

The Heart of the Sallow, when thus raised into a Tree, is red, like that of the Willow, and it is very firm: 'tis said, that if kept dry it will last as long as the Oak; and I have seen Trees from which very large Beams of it might have been cut, some of them being fifty Foot high, and of a good Thickness.

No Shrub requires more Care to defend it from Cattle than the Sallow, in the common Way of raising it. For the young Shoots and Tops of the Branches are very sweet, and they are very fond of them. The Value of the Wood, in this Way, consists in the Length and Straightness of the Poles, which will often grow to ten or twelve Foot: they will naturally grow to this if uninjured, but the Cattle biting off the Tops makes them commonly grow bushy, short, and irregular.

It is best for the Stem, as before observed, to cut the Sallow Poles in Spring, but it is for the Advantage of the Wood to cut it in Winter, while the Sap is down. Therefore when the Poles are large, and likely to bring a Price from the Turner and Joiner, it is best to cut them in NOVEMBER; but when they are small, and de-

signed for Fire Wood, or repairing of Fences, it is best to do it in SPRING.

One great Advantage the Sallow has over most of the other Shrubs, whether in an Hedge or Coppice, which is, the Ease wherewith it thickens them in Places where there are Vacancies by laying down. A Pole of Sallow of ten Foot long, may be brought to the Ground by a Chop almost through, at the Bottom, and laid in a small Trench opened for that Purpose; in this let it be pegged down, and covered with Mould; and there will rise a little Forest of Sallows from it; as many of which may be suffered to grow as are needful to the Occasion.

In most Places where there are Sallows, the Ground seems to produce young Trees of the same Kind, as it were of itself, often at a considerable Distance from the old ones. These rise from the Seed; they may be taken up, and trained to goodly Trees: but the Method by Layers is equally certain of Success, and is proceeding with little Trouble and great Regularity.

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### CHAP. LIII.

#### *Of the Fir Tree.*

THE Fir is a Tree not native of this Country, but which may be propagated here with Advantage. Its many and great Uses are sufficiently known; and every Husbandman must wish that he had it in his Power to raise it. How far that may be done profitably shall be shewn.

The Fir Tree is an ever-green; tall, stately, and of an extremely regular and beautiful Growth. The Bark is of a pale reddish brown, rough and crack'd in many Places: the Leaves are small, slender, and grow in vast Abundance on every Part of the small Branches: the Flower is a Kind of Catkin, and the Fruit grows on a different Part of the Tree. It is oblong, hard, and scaly, and is called a Fir Cone, and by the Vulgar a Pine Apple.

There are several Kinds of Fir in the Counties where that Tree is a Native; and a great many of them have been brought into our curious Gardens: but the Husbandman who would plant Firs with a View to Advantage, must make Choice of that Kind which is called the NORWAY Fir, or Spruce Fir, which is the Sort that affords the fine Deals we have from that Country. This is called by Authors the common Fir, or the Pitch Tree; and is distinguished from the others by the Smallness of the Leaf, and by the Fruit hanging down.

There are two or three other very hardy Kinds which have been long cultivated in some Parts of ENGLAND, and may be worth his Notice, but the Kind just mentioned is the Standard and principal Sort.

The first of these others is that called the CORNISH Fir. The Leaves of this grow like those of the Yew Tree, and the Fruit is very long and hangs down. This was originally an AMERICAN Tree, but some of them are planted, many Years since, in DEVONSHIRE, which still live and thrive there exceedingly.

Two others are the small con'd Fir, and the



the short leav'd Fir, both these came over also from AMERICA, but there are many Trees of them in DEVONSHIRE and CORNWALL, where they were long since planted, and where they stand, and have grown to a great Size. There are also some other Kinds that will bear our Climate very well: but as the first named Species is the most immediately to the Planter's Purpose, it is that he is principally to have in View.

As to the others, he may do well to mix some of them among his Plantations of that Species, to see the different Success, as this Kind of planting is but new yet in ENGLAND, with a View to Use. Perhaps in some Places one of the AMERICAN Firs may succeed where the NORWAY Kind would not; in that Case it will be right to raise such, and try their Value at the Market.

The best Soil for Fir Trees is a barren, poor, stony, or gravelly Land, where there is Clay at the Bottom; and their most favourable Situation is on the Tops and Sides of Hills. This alone would be a very sufficient Reason for the Husbandman's undertaking to cultivate them in ENGLAND, because there is a great deal of such Ground that is waste with us, for want of proper Growths. Though we hope one good Consequence of this Work, will be the remedying that Evil, because there are proposed in it valuable Kinds for every Soil and Situation in the Kingdom; so that no Inch of Land need be left waste, except by the Carelessness of the Owner.

But though a stony Soil with a Clay Bottom be the best for the Fir Tree, it is not the only Kind in which they will thrive. Firs of vast Bulk grow both in NORWAY and in NORTH AMERICA, on cold Clay, and many other Soils, as well as in lower Situations: on chalky Hills also it thrives excellently. This Tree does not succeed in very loose or light sandy Soils, nor in the rich mellow Earth, where there is little or no Admixture, but in almost any other it will thrive more or less, and yield a large Profit to the Planter.

There are several Plantations of them in different Counties, where they grow well on different Soils; but by Observation, and examining the Ground, I have constantly found that they succeed the best where there is a Clay at the Bottom; and where they stand expos'd as open upon hilly Grounds or Commons.

Nature produces a great Part of the Firs on cold rocky Mountains: we see by those Examples already cited, that it is a Tree which will grow in this Country: we have enough of these rocky and bleak Hills of little Value in the Kingdom; what therefore can be so reasonable as to try whether this Tree may not be planted upon them to Advantage.

The Fir Tree is to be raised from Seeds, and as this requires a different Management from the rearing any of our own Trees, I shall, for the perfect Information of the Husbandman, here set it down at large.

Let the Fruit, or Cones, be gather'd when perfectly ripe, from a large and well growing Tree: and spread upon the Floor of a dry airy Room. There let them lie all Winter.

N<sup>o</sup> 16.

In the first Week of MARCH prepare the Ground by plowing two or three Times, which will improve the Soil, and thoroughly destroy the Roots of all pernicious Weeds.

When this is done, let a small Spot of two Foot wide be better broke and levelled with a Spade at every ten Foot Distance; and while this is doing, let the Seeds be got out of the Fruit, or Cones, that have lain the Winter drying. This is to be done by soaking them, they are to be thrown into a large Tub of River Water over Night, and taken out in the Morning; at which Time the several Cells they contain will readily open, and the Seeds may be taken out.

On each Spot of the Earth levelled and prepared by the Spade, let there be sown half a Dozen good Seeds. Let them be cover'd about an Inch with Mould; and let a little Piece of a Furze, or black Thorn Bush, be laid over them by way of Defence. This will keep the Birds off; and will also make the Ground a little moist, which will promote their shooting.

When the young Trees appear, the Furze Bush is to be taken off, and that and two or three others stuck in the Ground round about each Spot; this will serve to keep off the Sun and Winds, as well as other Enemies to young Plantations.

Three or four Plants will naturally rise in each Spot. When they are at a little Height, the Earth should be drawn up about the Stem, and thus they are to remain three Years, laying some loose Stuff of any Kind about them, to keep the Ground moist and warm.

At three Years Growth all the Plants of each Spot are to be taken up, except one: the fairest and strongest is to be left, and great Care is to be had not to disturb its Roots in raising up the others, and to settle the Earth about it when they are gone.

Those which are taken up may be planted out in other Ground; and the single vigorous and thriving ones left in their proper Places, will then grow up apace into a beautiful Plantation. Their Nearness will naturally prevent their spreading into a great Quantity of Side Branches; they will run up in Height, and with a little Care, form a very beautiful Plantation of Evergreens: a great Ornament to the Place.

A little Litter should be strew'd about the Roots, which will keep the Ground moist, and answer the Purpose of watering. If any Water be necessary, it must be given in small Quantities, especially to those Trees which are transplanted: for many have been destroy'd by it, Practice when too much is given.

In this Manner a Plantation of Firs may be raised with great Ease, and it will flourish without any farther Care, on chalky or stony Soils; and on clayey ones that are not too wet; and best of all upon those Hills where the Husbandman finds it most difficult to make any useful Growth thrive.

They will be a vast Beauty to the Country; and the Profits arising from them when they are well understood, cannot fail to be very great.

They seem slow in their Growth while young;  
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but let not that dishearten the Planter; for it is only during a few of the first Years. After the first six or seven Seasons they shoot up at a great Rate; and increase in Bulk in Proportion. Fir Trees in ENGLAND have risen to sixty Foot Height, and a proportionable Bulk of Body in twenty Years. At about thirty Years they will be fit for felling for all the common Uses of Building, and if the fairest and stateliest Trees be suffer'd to stand ten or twelve Years longer, they will be fit for the Service of the Navy, or any other Offices that require the large and fine Deals.

Of all Parts of the Kingdom one would most wish to see these Plantations made about the Coasts, where the Demand would be always great for the Timber; but in every Place Deal is so useful a Wood, that it could never want a Market. It is unquestionable but that we might raise these Trees so as to supply Masts to our Vessels, and every other Purpose for which so much of this Timber is annually imported at so large a Price, and which grows upon just such Hills as we all the Time leave desolate and uncultivated.

Deal is in a Manner an universal Wood in Building. Our Wainscots, Floors, and other Parts of the House are made of it; it is very lasting when kept dry, and 'tis no little Advantage to the Carver and the Joiner, whose several Purposes it excellently answers, that it takes Glue particularly well. It would be endless to recount the other common Uses of Deal, and needless, all Persons knowing them. It is sufficient that I have shewn the Tree which affords that valuable Wood, may be raised in ENGLAND with Ease and great Advantage. It will be wonderful if some of those many Persons who have waste Lands on a proper Soil and Situation for this Purpose, do not begin: and then the Advantage will soon make the Practice universal.

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#### C H A P. LIV.

##### *Of the Pine Tree.*

THE Reader will naturally wonder why among the several Kinds of Fir Tree fit to be planted in ENGLAND, I have not named the Scotch Fir. But the present Chapter, and not the preceeding, is its proper Place. The Pines and Firs differ by very obvious Characters; and the Scotch Fir, as it is called, is truly not one of Fir, but of the Pine Kind.

The Pine resembles the Fir in many general Respects, but the great Article of the Distinction is this, the Leaves of the Fir are short, and grow singly from the Branches; though in great Quantities, and near one another; but the Leaves of the Pine are long, and they grow always two together out of a Kind of Sheath or Case.

This is the Distinction which all Authors have establish'd between the Fir and the Pine; and according to this it is very evident, that what is called the Scotch Fir, is one of the Pines, and not of the Fir Kind. Whoever has seen a Pine and a Fir, will also recollect that the very Appearance of the Scotch Kind is that of

the Pine, and not that of the Fir Sort; so that the Name is only a vulgar Error.

There are several Kinds of the Pine Tree rais'd in our Nurseries; but those worth the Husbandman's Regard are principally three; the common Pine, the wild Pine, and that called the Scotch Fir. They all bear Cones for Fruit, resembling those of the Fir, which from that obtain'd the Name of Pine Apples; but the Scotch Kind is distinguish'd from the rest by the Smallness and Whiteness of its Cones. Its Leaves also, tho' longer than those of the Fir, are short in Respect of others of the Pine Kind.

These three Sorts all delight in a stony or chalky Soil, with an elevated Situation. They will grow in the same Soils, and on the same Kind of Hills with the Firs, and there is no Doubt but that Plantations of them might be made, with the greatest Success, in many Parts of ENGLAND. We see them thrive very well in some Places, where they have been raised within the last twenty Years; and if they have failed in others, it is altogether owing to the Ignorance of those who undertook the Business. There are some Soils which will not suit them; and if they are against Nature planted in these, they must either perish, or at the best keep barely alive, without flourishing.

As the Soil which agrees with the Pine, is the same with that fit for the Fir; and the Fruit is also of the same Kind: the same Method of raising these Trees is to be used as was described in the last Chapter for the Firs, therefore there needs not be a Repetition of any Part of it in this Place.

Beside the Uses of these Trees as Timber, there is another Advantage to be consider'd in Respect of them; which is that Quantity of Pitch, Tar, Rosin and Turpentine, which they yield, and of which there is a vast Profit made in FRANCE, and many other Kingdoms.

We have Soils and Situations fit to raise them, and the Manner of doing it is very easy, and has been here laid down at large. There can be no Doubt of such a Plantation answering to the Expence and Trouble, were there none of these Advantages: but when it is found that they thrive here, and we have Plenty of them of a proper Growth, it will be very well worth while to try, whether or not these several valuable Articles of Commerce, may not be procured from them here as well as elsewhere. The Methods by which they are obtain'd are very easy: they are deliver'd at large in many Books; and in Case of Difficulties, it would be easy to bring over Workmen from the Places where they are constantly made, to ensure the Success. This may be understood as a remote Consideration; and it is therefore I do not enter upon it more at large here: but the general Method is so easy, and may be express'd in so few Words, that 'twere pity to omit it. They cut down thro' the Bark off the Pine Trees in Spring, and there runs a clear Rosin in great Quantities. They strain this, and the fine Part is what we call common Turpentine, of which there is a vast Consumption among Farriers, and many other Trades. The coarse Part is distilled with Water, for Oil of Turpentine, and what remains in

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the Still is common Rosin. The Pitch and Tar are made by burning the Wood in a close Place, which they cover up while burning, and the Juice which runs out in vast Quantities is Tar; and when it is boiled up to a Thickness it is Pitch.

Nothing can be easier than all this, appears in the Description, and Experience only can shew, whether it may not be as easy as advantageous in the Practice. If one Set of these Products could not be obtain'd from the Pine Tree rais'd in ENGLAND, the other might: if there could be a Difficulty about the Rosin or Turpentine, there can be none about the Tar and Pitch. That they may be made here is beyond a Question, and they are of sufficient Value to make it well worth a Trial.



# C H A P. LV.

## Of the Juniper.

**A**FTER the mention of these tall resinous Trees, it may not be improper to introduce a low Shrub, which is in some Degree of their Nature, and which is a Native of our Country, the Juniper. I shall not speak of it as a Kind that can be made to yield any very great Profits; but we see that it naturally grows on our worst Ground, such as the barrenest of our Heaths, and nothing could be so easy as to plant such Places entirely with it. There can be no Doubt of its growing and thriving there, because it does that naturally; and if there be among these Grounds, any that cannot be put to a better Use, it will certainly be an Advantage to raise this upon them, rather than to let them lie absolutely waste and desolate.

The Juniper, although a small Shrub in ENGLAND, rises to a considerably large Tree in some other Parts of EUROPE, and it would be worth while to raise it from Seeds of those Trees, carefully gather'd for that Purpose, and see whether we could not then get it to the same Stature on our Heaths and Commons.

The Bark is of a reddish brown, and smooth; the Leaves are small and narrow, of a fine bright green, and prickly. The Flowers are small and inconsiderable; the Fruit is a round Berry: it grows on a different Part of the Tree from the Flower, and is soft and pulpy, with three Seeds within.

The natural Soil of the Juniper is a light, loose, and sandy Earth, it will grow on this though it be very barren; and will bear any Exposure; but it succeeds best where there is a firm Bed under the Soil.

It is propagated from the Berry, which takes very readily, and shoots quickly; and with a little Care at first, will be soon out of the Way of any Accident.

I would advise the Husbandman who should think of such a Plantation, to get some Correspondent to have a Parcel of Berries gather'd from the large Tree Junipers abroad, and carefully sent over.

The Ground should be broken with two good Plowings; and in the Beginning of MARCH, the

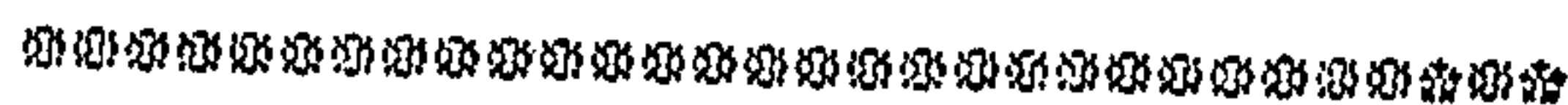
Berries should be sown on it pretty thick, harrowing them well in. They will lie in the Earth till the next Spring; so that at proper Times a Person should be employ'd to go over the Land, and weed it carefully: when they begin to appear, it will be of great Use to sprinkle some Furze Bushes over the Ground by way of Shelter and Defence, removing them as the Plants grow up.

The next Spring the young Plants should be thin'd, and left at about four Foot Distance; and after this Time they may take their Chance, for they are hardy enough to shift for themselves: only that at the End of one Year more, the Husbandman should go over his Ground, and cut down about half of them within five Inches of the Earth, leaving the fairest and best growing Plants standing entire. By this Means he will have a very beautiful Evergreen Plantation, part Shrub, part Tree, and after a little Time he may send People annually to gather the Berries; which, if the Soil and Situation favour the Trees, will be produced in considerable Plenty, and will always bring a ready Price from the Distiller or Druggist.

The Wood of the Juniper, when it grows to any Size, is of considerable Value. It is yellow, of a fine close Grain, and extremely tough. It has a very fragrant Smell, in some Degree resembling that of Cedar; from which many People have been led to call the Junipers of the different Parts of the World, Cedars. The VIRGINIAN Cedar, the BERMUDAS Cedar, and the like, being really no other than Junipers.

The Juniper Wood is excellent for Turning, Carving, and many of the finer and more delicate Uses. When large enough, its Grain is so beautiful, as well as its Colour, that the Cabinet-makers would be ready enough to purchase it at a good Price.

Upon the whole; the Cultivation of the Juniper is so easy, and the Ground on which it would grow is so cheap, that it must be very well worth while to try at the raising it to a considerable Value, of which there is a very fair Prospect, since there is a Certainty of its sufficiently answering the Expence and Trouble.



# C H A P. LVI.

## Of the Yew Tree.

**T**HE Yew is a Tree like the Juniper, of less Value, and less frequent Use than the Generality of those that have been spoken of; but which will in the same Manner grow in Places where Trees of more Value cannot find Nourishment, and is therefore very well worth the Notice of the Husbandman.

It is an Evergreen Tree, which, when suffer'd to grow at large in a favourable Soil, will arise to a considerable Height, and a proportion'd Bulk of Body, but without any great Beauty or Regularity in its Branches. The Bark is of a pale reddish Colour, as is also the Wood: the Leaves are of a very dark blackish green: the Flowers are small and inconsiderable, and the Berry stands in a red juicy Cup,



so that it, in some Degree, has the Appearance of an Acorn in Miniature.

The Use of the Yew in Gardens is well known. Though we no longer allow of the cutting it into Peacocks and Giants, it is in Credit for Hedges which are very thick, and an excellent Defence for the tenderer Growth in the Quarters. But the Husbandman is to consider the Yew in another Light; as it may answer his Purpose in the Fields where it is to stand for Timber, without any Regard to its Form.

We find the Yew Tree naturally wild on many of our most barren Hills, particularly in SUSSEX and HAMPSHIRE; and in such Places it may be very well worth while to multiply it; for it will thrive perfectly well in the most barren Soils; and on the most exposed Places; and after standing a sufficient Time, for it is not a slow Grower, it will yield a very considerable Profit.

The common Practice of our Nursermen is to raise the Yew in small Beds from the Seed, whence they remove it at two Years old to greater Distances; and thence, after three or four Years Growth in the new Soil, they transplant it into the Gardens, where it is to remain: but the Husbandman is not to be guided by the Nursery in his raising of Trees. This Method may do very well when the Yews are to be removed into a rich Ground; but as he is to make his Plantations on very bad Soils, he must raise his Trees on the Spot.

For this Purpose let him gather Yew Berries when ripe, from large and tall Trees; and employ People to open the Ground at every six or seven Foot, where he intends his Plantation.

In each of these Holes, thus dug, he must sow eight or ten of the Berries, with the red juicy Part about them; and throwing a Piece of Furze Bush over every Hole, he is to leave them to take their Chance. They will rise very freely, and all he will have to do afterward is to pull up the least promising of them, till only one Plant is left in each Place. These he should go over every SPRING, trimming off the Side Branches, and training them up, as much as possible, for a single Trunk.

The Yew wants this Care as much as any Tree whatsoever, for it is apt to spread and branch out from the lowest Parts of the Trunk; and when it takes this Growth it becomes bushy, and has no Height of Body. It is owing to this, and to the favouring the spreading Growth of this Tree in Gardens and Nurseries, that we so rarely see a Piece of tolerably large Yew Timber. Here and there an old Tree, that has stood at the Head or Foot of some Grave in a Church-yard, takes its own Course into a tolerable Trunk; Boys cutting off its lower Branches. Otherwise we rarely meet with it, and never in the Perfection that it might be brought to with due Care.

The Wood of the Yew Tree is extremely firm and beautiful: it is generally vein'd with great Elegance, and is capable of a fine Polish. Bows were, in old Time, made of it: at present it sometimes supplies the Place of Lignum Vitæ, in Bowls, and is greatly admired in whatever Form 'tis met with.

Where large Trees of it have been cut down, People upon the Spot have, in Curiosity, had

Tables or other Pieces of Furniture made of it, and they have always been admir'd by all who saw them.

The Yew affords a Timber, the Uses of which are but little known; however, if it were any where so rais'd that it could be had in Plenty, and of a good Size and regular Growth, Uses enough would be found for it. The more irregular Pieces would be employed by the Wheel-wright and Mill-wright, and would make Posts, and many of the Country Utensils; and the regular and even Parts would bear a Price with the Cabinet-maker and Turner; being superior, in all Respects, to a great many Kinds which they constantly use, and which they buy at a large Price.

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## CHAP. LVII.

### *Of the Box.*

WE are descending to the Consideration of Trees of much less Value than those named in the first Chapters, but they are still such as have their Use, though less considerable, and from certain Circumstances of their Growth they may be worth the Husbandman's Notice, since he may often raise them to Advantage.

The Box is a very little Tree, its Bark is yellowish, its Wood very firm, and also yellow; the Leaves are each composed of several smaller, set on the two Sides of a middle Rib, and these are roundish, of a dark Green, and continue all the Winter: the Flowers are small and inconsiderable, the Fruit grows on another Part of the Tree, and is divided into three Portions, containing two Seeds in each Division.

We usually distinguish two Kinds of Box, a Dwarf Sort that is us'd to set round Borders in Gardens, and one that is taller, called the Tree Box. This last is the only Kind worth the Husbandman's Notice. Beside these two, there is a narrow-leav'd Species; but its Timber is not so fine as that of the common Sort; though the Difference be not great in this Respect, any more than in their outward Appearance.

The Box loves a poor Soil, and a bleak Exposure. It will grow upon the barrenest and worst of our Lands, whether they be stony, chalky, or of whatever other Kind. So that there are many Places where nothing better will grow, and where it may be useful to raise it.

The common Way of propagating Box in our Nurseries is from Cuttings, which they keep well shaded and water'd, till they take Root; but this is not the Practice to be observed by the Husbandman who would have this Tree on his barren Grounds.

He may raise it from Seed, and that must be done upon the Spot, in the same Manner as has been just directed for the Yew, or he may plant it from Layers, as directed of the Elm. These take Root freely enough. If the Ground have any Richness, this is the best Method; but where that is very poor the Way from Seed is to be prefer'd.

Which ever Way they are rais'd, the Husbandman must go over his young Plantation once a Year, to take off the large Side Shoots, and train



train up his young Trees to a Trunk. They will by this Management, rise to an Height and Bigness, of which they would have no Imagination who had not seen them when they grow freely, as on BOXHILL in KENT, and some other Places; but in these they do not arrive at that Height and Value they will do when train'd for it from the Beginning.

The Wood of the Box, when of any tolerable Size, is of considerable Value; and when rais'd to the Bigness and Regularity that it would attain, by the proper Methods here directed, few have any Notion of the Price it would bring. It is the heaviest of all our ENGLISH Woods, and one of the firmest and hardest: its Colour is very beautiful, and the Grain fine. It is used at present for the making of Mathematical Instruments, and many other Things that require Strength and Firmness in a small Body, as Combs and the like. The Turner also is glad of it on many Occasions; and would be on many more if he could have it of a Size for his larger Works; and this would easily be brought about, by the proper training of it up, and giving it Time for the Growth into a well-bodied and regular Tree.

#### C H A P. LVIII.

##### *Of the Cypress Tree.*

**T**HE Cypress is another of those Trees which, though at present confin'd in a Manner to the Garden, might be brought out into the Field with Advantage; and which, though not so large as many others, is very valuable.

The Cypress is an handsome Tree, and when the right Kind is planted, arrives at a considerable Size. The Leaves are flat, and as it were scaly; the Bark is uneven and brown, the Flowers are small and inconsiderable, and stand at the Ends of the Branches; the Fruit grows on other Parts of the Tree, and is roundish, hard, and woody: it cracks when it is ripe, and contains in its different Divisions several hard Seeds.

There are two Kinds of the Cypress Tree, one which naturally grows up erect, and the other which spreads its Branches. The second, which is known by the Name of the spreading or the male Cypress Tree, is to be prefer'd. There is beside these another very unlike them, except in the Fruit: it is brought from AMERICA, and loses its Leaves in the Winter, whereas the others are green all the Year. This is not worth the Husbandman's Notice; the Wood of the spreading or male Cypress, being greatly preferable to that of any of the others.

The proper Soil for the Cypress is a warm Gravel: it will grow on sandy Grounds, but does not thrive so well as in the other, among which there is usually a Mixture of loamy or marly Earth.

It succeeds best in an elevated Situation, but should not be planted on entirely exposed Places; on the Side of an Hill, where there are Springs at a moderate Depth, and where there is the Defence of Hedges or Trees, it will thrive excellently. There are many Pieces of Ground of

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this Kind, on which at present nothing of any Value grows, which would carry up the Male Cypress to great Value.

This is one of those Trees so utterly neglected, that 'tis hard to say what is its Value; but the Esteem in which its Timber is held in other Countries at present, and the Value that was set upon it in earlier Ages, shews very plainly that 'tis not without a Title to the Husbandman's Care.

The Cypress is to be propagated by sowing the Seeds; and to this Purpose the Husbandman's first Care should be to get them good, which he will not easily do in ENGLAND, for though these Trees bear Fruit with us, it does not ripen perfectly.

I would advise the Planter of Cypress therefore to procure some well ripen'd Fruit from ITALY, and to sow the Seeds with due Care in his Ground.

In the first Place, the Fruit is to be laid at a Distance before the Fire, till warm through, upon which the Cells will begin to open, and the Seeds may easily be pick'd out. But Care must be taken that the Heat be not too great, because that would destroy their Power of Growth.

These are to be sown in the Middle of MARCH, upon the Ground where they are to stand, Spots being dug and prepar'd at seven Foot Distance for that Purpose.

Ten or a dozen Seeds are to be sown in each Spot, and when they are come up, and have advanced a little in Growth, the young Plants are to be pull'd up, till only the one flourishing Shoot be left in each Spot. These are to be train'd up for Timber, by cutting off the spreading Branches with Moderation, for the Tree naturally spreads, and too much Violence must not be done to that general Form of growing, lest it be spoil'd.

Little Care is requir'd after the Trees are once established, but they take Time; for the Cypress is not one of the quick Growers.

The Timber of the Cypress is of great Value, its Texture is close, and 'tis of a firm Body and fine Grain. It is excellent for Chests for keeping of Cloaths, the Moth never coming near it; and no Wood whatsoever is more durable, perhaps none so much. It was anciently a Custom to bury in Cypress Coffins. And they lasted surprizingly. The Wood is undoubtedly excellent for many Uses, and there only wants a Supply of it. The Turner, the Cabinet-maker, and the Joiner would soon find Uses enough for it, if it were once brought to the Market, for it is greatly preferable to many of the Foreign Woods, which they purchase at a very considerable Price. And the worst Pieces of it would be fit to be employed on all the common Occasions, in which Strength and Durability were requir'd, for it will stand wet or dry beyond almost any other Wood.



## C H A P. LIX.

*Of the Cedar.*

**T**HE Cedar is another of the Trees which, though rais'd among us only as an Ornament to Gardens, might be very well cultivated abroad in Fields, in proper Places, for the Value of its Timber; the Value of which is sufficiently known.

Several Trees, as has been already observed under the Article Juniper, are called Cedars, which are of that Kind, bearing Berries, and the most of them rising but to small Heights; but by the Cedar is here meant that large beautiful and spreading Tree, which is commonly known in ENGLAND by that Name, among Gardiners and others, and is distinguished farther by the Name of Cedar of LEBANON.

This is a large and stately Tree, with remarkably spreading Branches, standing out almost flat from the Trunk, and often drooping. The Bark is rough and of a redish brown, the Leaves are very narrow, and grow many together in a Tuft, so as to resemble a Pencil: the Flowers are a Kind of Catkins: the Fruit grows on another Part of the Tree, and is a large and beautiful Cone.

The natural Soil and Situation of the Cedar are stony and mountainous, nor will it refuse to live in the coldest and bleakest Exposures. The Place where it once grow in the greatest Abundance of any where in the World, and from whence it has, for many Ages, had its Name, gives Proof of this; for it stood in the most thriving Condition, on those Parts of Mount LEBANUS which are, in a Manner, all Rock, which are exposed without the least Shelter, and where the Snow lies to a considerable Depth almost throughout the Year.

We have many barren, bleak, and rocky Hills in ENGLAND, on any of which it will grow, to which it will be a singular Ornament, and where it will yield a very great Profit to the Owner. I hope that one of the Benefits attending this Publication will be, the leading People who have these barren Lands, that have lain so many Ages waste, to plant them with some useful Product. The Cedar is so peculiarly fitted for this Purpose, that there is no Soil so poor as to be too bad for it; and that it will not thrive so well on such as is better. Sandy, gravelly, and stony Ground, which will give Nourishment to nothing else, support the Cedar, and raise it, in a very moderate Time, to a large and valuable Tree, for though, in general, the Trees which live in watery Places are the quickest Growers, the Cedar, though it love these dry and barren Soils, is far from being one of those that should be called slow.

But though this be the proper Soil of the Cedar, and that wherein it thrives best, there is scarce any in which it will not live. Cedars are seen flourishing in the lowest Grounds, and in Soils absolutely boggy, in several Parts of the World: but in these they grow very slowly and irregularly; and their Timber, when ex-

amined, has not its true Fragrance or Beauty; nor its proper Firmness.

The Cedar is to be rais'd from Seed, and that should be done on the Places where it is to stand when it is thus rais'd for Timber; for the Soils I have directed for it are so poor, that a Plant removed into them from any other would have an ill Chance to thrive.

The Cones of the Cedar are to be had from Abroad; there are many of them brought every Year from the LEVANT, and to be had in LONDON. To get out the Seeds an Iron Spike must be driven through the Cone lengthwise; this rends and separates its Parts, forcing them so from their Lodgments, that they may be pick'd out with the Fingers.

These Seeds are to be sown early in the SPRING, six or eight on each Spot where a Tree is intended to stand, and these Spots should be prepared at five and thirty Foot Distance.

A Piece of Furze Bush should be laid over the Place; and kept there till the young Plants which have risen from the Seeds are of some Height. Then they are all to be taken up, except one, leaving the fairest and most thriving; and to train this up strait a Pole must be set in the Ground near it, and the leading Shoot gently ty'd to the Pole as it grows. This is particularly necessary to the Cedar, which is apt to incline to one Side in its growing.

The young Trees being thus secur'd for Straitness, are to be left to Nature. They will grow but slowly at first; but very soon after they have arriv'd at a good Fixture in the Ground, they make amends for it, by a speedy shooting up; they are not to be train'd for Height in the usual Manner, by cutting off the Side Branches: for the lopping of all resinous Trees is prejudicial in the highest Degree, and of none more than the Cedar. Therefore when it is thus carried strait in the leading Shoot, by tying it up, the rest are to be left to Nature, and although a great many large and spreading Branches are found on every Side, the Trunk will be sufficiently nourished, and will rise to such an Height and Thickness, as to yield Timber fit for all the Purposes to which such Wood can be used.

It is very singular, that as the worst Soils, so the hardest Seasons agree better with this Tree, than such as are richer or milder. The Cedar does not always ripen its Fruit with us, but an hard Winter is always found to promote its doing this. It is therefore evident that the Severity of the Cold is of Assistance to the Cedar, giving it Strength and Vigour.

This may be a farther Inducement to our Husbandmen and Owners of bleak, barren, and exposed Land, to plant the Cedar on it, for where a Tree ripens its Fruit preferably to other Places, there doubtless it will be more certain and secure to succeed in a Plantation.

The Size to which the Cedar will grow before it begins to decay, is very considerable. We find in MAUNDRELL's Travels, that there are at this Time on Mount LEBANUS, Cedars that appear to be quite sound, and are between thirty and forty Foot in Circumference in the Trunk; if we could raise them to any thing like this in

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ENGLAND, the Value they would have is easily known.

The Wood of the Cedar is of a beautiful redish Colour, and of a fragrant Smell. It is sufficiently strong, but is liable to split; Care therefore is to be taken in the working it; but when wrought it endures for ever. This is its great Quality; and while it remains entire itself, it preserves also what is kept in the Chests made of it; no Moth or mischievous Insect ever coming into them. We read in the old Authors, astonishing Accounts of the Duration of this Wood; and by many certain Instances we are led to put more Faith in those Relations, than it would be natural to do without Experience.

The Size to which we read of their growing is also countenanced by what we see at present. A Man would start at the Account of a Cedar eighteen Foot in Diameter, and a hundred and thirty in Length, had he not read of that just mentioned by MAUNDRELL, and which is to be seen by the Curious at this Hour.

There is no doubt but this Tree may be rais'd in ENGLAND in any Quantity, nor can there be any Question of a Demand for the Timber, and that at a very considerable Price, as soon as it should be regularly brought to Market.

Upon the whole, it may not be improper to conclude the present Part of our Work with this short Observation on the planting Timber; that in many Cases it is preferable to any other Growth, even upon Land that will bear any thing: but in general, the great Advantage to be made from it, will arise from the propagating it in Places

where other Things will not grow, or in Spots where they cannot conveniently be rais'd.

The several Kinds of Timber Trees have been here treated of at large, and it will be an Advantage for the Person who intends to plant, if he will first go through the Account of them all with due Care, that he may be able to suit the Growth to the Nature of his Soil, and the Situation of the Land.

We have shewn that there is no Soil whatsoever, on which some Kind of Tree will not grow; nor any Exposure which some will not bear: but the great Article of Knowledge, in this Branch of the Husbandman's Business, consists in the exactly knowing the different Value of each Tree, and the different Kinds that each Land will bear.

Even in those Soils and Situations whereon any Kinds of the common valuable Timber Trees will grow, there are still some which will succeed better than others; and in order to make the greatest Advantage from a Plantation, this should be known. In the same Manner, even on the worst there are generally two or three at least that will succeed, let him therefore have all these in his Eye when he is about to begin a Plantation; and considering thoroughly their several Advantages, and the Circumstances of the Ground, let him take Care to chuse that which will be most sure of Success, and to bring the greatest Profit. It is not sufficient that he know how, by this Means, to turn his worst Land to Account; but he should know how to turn it to the greatest that it will bear.

End of the F O U R T H B O O K.







A  
COMPLEAT BODY  
OF  
HUSBANDRY.

BOOK V.

*Of the Animals necessary and useful in Husbandry and Farming.*

In FOUR PARTS.

I. Of CATTLE.

CHAP.

1. Of the Horse in general.
2. Of the Choice and Management of Horses for the Farm.
3. Of the Saddle Horse for the Husbandman.
4. Of breeding of Horses.
5. Of weaning Foals.
6. Of breaking Horses for Services.
7. Of the Farmer's Number of Horses, and their working.
8. Of the turning Horses to Grass, and taking them up.
9. Of the Ass.
10. Of the Mule.
11. Of the Bull, and his Kind.
12. Of the Ox.
13. Of the Cow.
14. Of the Calf.
15. Of Sheep, and their several Breeds in this Country.
16. Of the Choice of Sheep.
17. Of the breeding of Sheep.
18. Of the shearing of Sheep.
19. Of the breeding up of House Lambs.
20. Of Hogs, their Advantages and Evils.
21. Of the several Breeds or Kinds of Hogs.
22. Of the feeding of Hogs.
23. Of Goats.
24. Of the Rabbit in general.
25. Of the wild Rabbit.
26. Of the tame Rabbit.
27. A profitable Method of keeping Rabbits.

II. Of FOWLS.

CHAP.

28. Of the Cock and Hen, their Kinds and Choice.
29. Of the breeding of Poultry.
30. Of the bringing up of Chickens.
31. Of Capons.
32. Of Turkeys, their Kinds and Choice.
33. Of the breeding and raising of Turkeys.
34. Of Geese, their Kinds, and the Profits of keeping them.
35. Of the breeding and feeding of Geese.
36. Of Ducks.
37. Of the keeping of wild Water Fowl, and of Decoys.
38. Of the Swan.
39. Of the Peacock.
40. Of the Pheasant.
41. Of the Pigeon.

III. Of Fish.

42. Of the Advantage of Fish Ponds.
43. Of the making of Fish Ponds.
44. Of the stocking of Fish Ponds.
45. Of feeding, preserving, and taking the Fish.

IV. Of INSECTS.

46. Of Bees, their Nature and Products.
47. Of the Hives, and the Manner of placing them.
48. Of the swarming of Bees.
49. Of hiving the Bees.
50. Of preserving the Bees.
51. Of taking the Honey and Wax.





*The Bull put to Labour.*

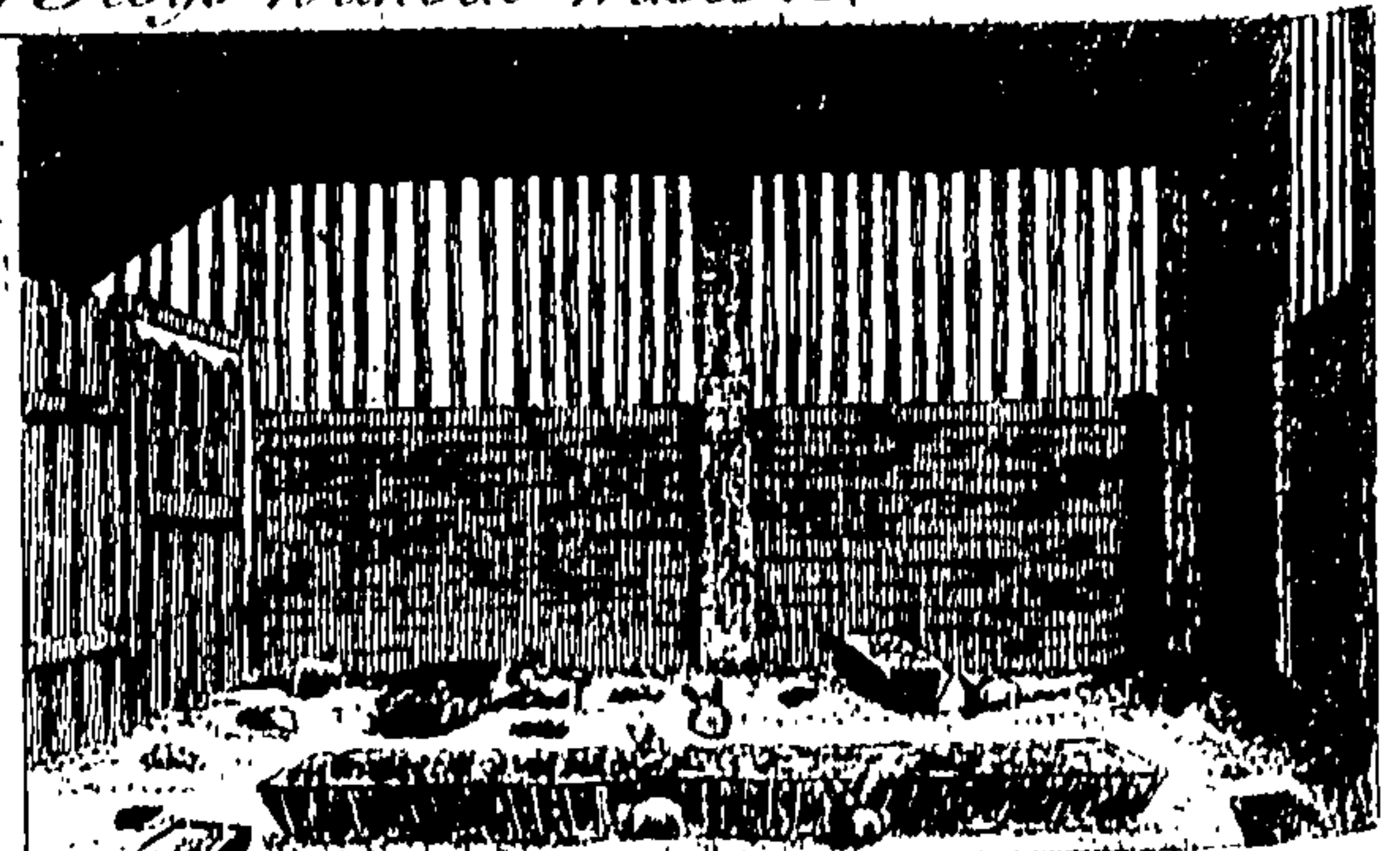
*The Pit for breeding of Mules.*



*The Washing and Shearing of Sheep.*



*The Method of feeding Pigs without Waste.*



*Elevation and Section of the Building for breeding of Rabbits.*



The INTRODUCTION.

*Of stocking the Farm.*



WE have in the four preceeding Books inform'd the Husbandman concerning the Nature of his Soil, the Advantages of Inclosure, the Use of Manures, and the Benefit of Plantations; we are in this to advance to the great Article of stocking his Farm.

When he has made himself acquainted with the Nature of every Part of his Ground; when he has fenced, planted and prepared it for his Undertaking, it is then ready to receive his Cattle: part of which are to be fed upon its Produce, and part employ'd also in the Labours of tilling and improving it. These are necessarily a great Expence, and they are expected to produce and yield him a proportionable Profit. This they are in their Nature qualified to do; but this Profit will be greater or lesser, in Proportion to his Skill in ordering and managing of them according to their several Natures.

From some of these he is to have Labour; from others Food, and Articles of Trade; and from all of them properly managed, he may have many occasional, and, as it were, accidental Profits. The Horse is to save him the Toil of his Servants in many Things, the Ox and Sheep are to supply his Kitchen, and the Market; as also, the Hog, and other Kinds; but the home Consumption is not all the Source of his Profits: many of their Parts and Products are exported at a great Price; and he will be able to make the more Advantage of his Stock, as he is the better inform'd of every one of these several Particulars; and adapts his Care to such of them as his Circumstances, and Situation render the most immediately advantageous to him.

He is to consider his Cattle with Respect to their Food, and its several Kinds, and with regard to that great Article, their Dung, the Uses of which have been fully treated of already: this will lead him to enquire into their proper Management in the Field, in his Yard, and in the Stable. The several most beneficial Methods of regulating their Food, Litter, and Standing,

will be a very principal Object of our Attention, under their several Heads in the succeeding Chapters. In which, proceeding upon that sure and certain Guide, Experience, we have Hope of leading him to a much more beneficial Method of conducting himself in several Respects than is generally known at this Time.

In this Place it may be necessary to caution the Reader not to suppose us deficient with Respect to those Articles; which, altho' they regard Cattle, are reserved according to the Original Plan of our Work, to distinct and separate Parts of it.

In this Place we are to consider the Husbandman as purchasing his Stock, and disposing and employing it on his Land; after which we are to proceed to the immediate Labours to be employ'd upon it. The several Products of his Stock in Hide, Tallow, and the other Articles are to be consider'd hereafter in their proper Place; as also the Diseases to which the several Kinds may be incident; for we do not suppose him to purchase one Kind labouring under Distempers; or to intend the immediate slaughtering of the others. These Things therefore are to be treated of hereafter, and in the present Part of our Undertaking, we are to consider the several Creatures themselves; their Service, Breed, Management in every Respect, and the several Methods whereby they may be render'd most beneficial to him while he keeps them, and most advantageous in the Sale, when it is proper he should dispose of them.

We shall divide these Animals as they concern the Husbandman under four general Heads, two larger and more important. 1. His Cattle and his Poultry; and two lesser, but yet very worthy of his Consideration. 3. Fish; and, 4. Insects.

The two first of these every one is sensible, demand the most careful Attention, as on them depends a very considerable Part of the Farmers Expence, and his Profits; the two latter are not so much regarded as they deserve, especially the Article of Fish. We hope to be able to set that Article in so true a Light, that the Husbandman shall for the future understand it as one of the regular Parts of his Occupation, and not the least in Profit.

BOOK V. PART I.

*Of CATTLE.*

CHAP. I.

*Of the Horse in general.*

WE are sensible Volumes might be written on the Horse, for Volumes have been written on it already, and the Subject is not exhausted: but the Business here will be to select from all that has been said, and may be said on this copious Subject, that which is to the immediate

N<sup>o</sup> 17.

Purpose of the Husbandman.

We shall endeavour therefore to separate the useful from the superfluous and ostentatious; and no more to omit any Part of the one, than load this Treatise with any of the other. It is not the Purpose here to consider the Horse as the Racer, or in the Manage, but as the useful Servant of the Husbandman, who is to buy him for his Purposes, with Remembrance, that if he can

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breed from him, sell him at an Advantage, or any other Way make him produce a certain Profit, 'tis all within the Compass of his Profession. We would no more have our Farmer a Jockey, than we would have him a Sportsman; but so much of every Branch that regards this Animal, as may be useful to himself, without transgressing the Bounds of his proper Profession, we would have him know, and so much we shall endeavour to inform him.

The Diseases to which this noble Animal is subject are very numerous, and very little understood. These destroy many a useful Creature that might be preserv'd with a little proper Care; and it is not too much to say, that after all that has been written on this Matter; after the innumerable Bundles of Receipts in old Authors, and the Discoveries, great as they are, which have of later Time been made by ingenious Foreigners, as well as by our GIBSON, BRACKEN, BARTLET, and the rest, there is no Book in the ENGLISH Language so much wanted, as a compleat System of Farriery.

It is not within the Compass of our Undertaking to enter upon such an Article at large, nor is any more than a small Part of what might be said on that Head necessary to the Farmer; but that Part we shall endeavour to lay down in its Place, by the Assistance of many Enquiries, and a long Experience, if not in a compleat and accurate, at least in a useful Manner.

It is but of late that the Consideration of Horses has fallen into the Hands of those who had any of the Requisites for being capable of a due Care of them. Farriers have been used to be of the most ignorant among Mankind; and every Blacksmith called himself at one Time a Horse Doctor. Of late the great Use of this noble Creature in our various Concerns of Business and Pleasure, has rescued it out of such Hands, and made it a subject for more Education and Abilities; and though the Practice be yet far short of Perfection, great Advances have been made in it, with which the Husbandman should not be unacquainted.

So ignorant have the old Writers on these Subjects been, that they are continually mistaking the very Seat and Place of the Diseases in this Animal; and at this Time nothing is so common, as to see those who know no more of the Creature than what they read in those erroneous Books, rowelling and burning a Horse in one Place for a Disorder, the Seat of which lies in another; and in one which cannot be affected in any Manner by what is done.

This may stand as a general Instance of that Ignorance which reigns too universally with respect to Horses: excepting for the Cheats of Jockeyship, People are as unskillful in every other Respect; for all that seems to be studied now about a Horse is, how to cheat the Purchaser.

What respects the Diseases of this Creature, will be explain'd hereafter under its proper Head; and here we shall endeavour to set the Husbandman as right with respect to the Nature and Kind of his Cattle, and his Management of them in Food, and at Labour.

Horses, though all of one Species, may be

divided into many Kinds according to the different Services for which they are design'd. Those for the nobler Exercises, or the Uses of Pleasure, demand a great deal of Care and Trouble, as well as a large Expence; but the Farmer's Horses, which are for Labour only, require comparatively very little of either.

Let him not take his Directions concerning them therefore from Books, where the principal Regard is shewn to the Racer, the Hunter, or the manag'd Horse, for these do not belong to him: the plain and cheap Practice used for the Cart Horse, and the poorer Sort of Road Nags, is all that concerns him: this he will find here laid down from repeated Trials, and let him compare it with the Management of his Neighbours, in order to see how it agrees with that, and how it excels it; for we would have him learn not only from what he reads, but what he sees; and improve his Knowledge from the Miscarriages as well as the Success of others.

## CHAP. II.

### *Of the Choice and Management of Horses for the Farm.*

IT is a Thing of great Concern to the Husbandman to proportion the Number and Kind of Horses to his Farm, and he is also to consider the Sex. For in some Cases breeding from them may be a Thing of great Advantage, and under other Circumstances, it will not be prudent in him to think of it.

I have observ'd already that a certain Proportion should be kept up as near as may be between the Arable and Pasture Land of a Farm; but this cannot in the Nature of Things be always done so exactly in Practice as might be wish'd from Theory. Now the Excess in either Kind, where it cannot be avoided, will give the Husbandman a proper Caution as to the Sex of this Cattle; as the Nature of the Employment for which he wants them will for the Kind.

The Horse for Plow must be strong, no matter for his Shape. But for Cart some Care should be used in the Choice, and in the Size. These should be big breasted, large bodied, and strong limb'd; and they should always be bought of a moderate Size, not only that they may match with one another; but that others may easily be got to match with them when any die, become useless, or are sold out.

The having Horses for slow Draught all of a Size, or nearly so, is a very considerable Article; for otherwise the Team never work equally, nor at Ease to themselves; and the Husbandman has not the Advantage of half their Strength, though they go through an equal Fatigue: the tall Horses hanging up the low, and it being altogether impossible that they should draw evenly together.

It is a Benefit in the Horse intended for this Service to be sluggish: the fittest for it are such as require the Whip, rather than such as are ready to draw more than needful.



One thing more I shall observe to the Farmer, which is, that he avoid that very common Fault, the making one Horse serve for different Uses. Nothing is so wrong. Let him never put a Saddle upon his Cart or Draught Horses, for it alters them in their Pace, and renders them awkward and troublesome in their ordinary and proper Labours.

After the Kind, let the Husbandman consult the proper Sex of these Cattle, and in this, as I have observed, he is to be directed by the Nature of his Farm, and the Proportion of one Kind in his Land to another.

Mares are naturally more profitable than Horses, because, beside their Labour and Service, they yearly will bring forth a Colt. But let not the young Farmer resolve at once, for this Reason upon the buying that Sex, he must look farther. If he have a great deal of Pasture Ground, in proportion to his Arable, then he will do right to stock himself with Mares; but on the contrary, where the Arable Land is the greatest Quantity, and the Pasture but little, he will find it much more to his Advantage to have Stone Horses or Geldings.

We see that in some Counties the Farmers in general purchase Mares, and in others they in general keep Horses for their Service; and this, at first Sight, may seem idle; but it is founded on this Rule, and on what they find answer best upon Experience, because their Lands are so disposed. In some Counties the Arable is in general over-proportioned to the Pasture Ground; and these are the Places where they keep Horses mostly; and in others the Pasture Ground in general over-balance the Arable, and these are the Places where the Run is upon Mares.

When the Nature of the Farm thus recommends it to the Husbandman, to purchase Mares rather than Horses, he is to remember that it is of more Importance to him to consider their Shape: because on that will, in some Measure, depend the Value of the Breed.

Let him chuse his Mares with a good Forehand: the Neck, Breast, and Shoulders are, in this Respect, to be his principal Regard; for as to the rest of the Shape it is not of so much Consequence.

But though he don't much regard the Shape, let the Body be large; for it is a great Advantage to the Foal to have Room, while it is growing in the Mare's Belly.

The Foals that the Husbandman shall have from Mares thus chosen, will pay him very well for his Care: they will generally be well-shaped; and it may be worth his while to sell them at about six Years old, when they will usually bring a fair Price.

Nor let him think that the keeping them to this Age before he disposes of them, is any Hardship; for their Work, the greatest Part of the Time, will very well pay for it.

This is so certain, that where the Husbandman has not the Advantage of breeding, from a Deficiency of Pasture Ground, it is worth his while to buy Colts young, and train them up to that Age for Sale. This is practised in many of those Counties where the Arable in general exceeds the Pasture; and it is very well known in particular,

that the Husbandmen of HERTFORDSHIRE buy Foals out of LEICESTERSHIRE, which is a good breeding County, to sell again at an Advantage. They buy them at two or three Years old, and sell them again at six. The Foals improve every Year; their Labour answers very well for their keeping; and at the End of this Time they are fit for Coach Horses, and are commonly sold in LONDON for that Purpose.

In some Counties an ordinary Sort of Horses are much required for Carriage of Loads, as Packs, Panniers, and the like. When the Husbandman wants a Creature for this Use, let him observe to chuse him of a stout Make, but not tall. Let him have a broad Back, out Ribs, full Shoulders, and thick Withers. This is a very material Circumstance, for an Horse that is thin in that Part is always galling: which is a very great Inconvenience to Horses that are to carry Burthens.

After his Shape, let the Purchaser observe his going, and examine carefully his Pace. That Horse is best for this Service that takes the stoutest and best Stride with his Feet. He is neither to trot nor gallop: all his Business is a Foot-Pace; and for this Purpose the Horse that takes the largest Steps, always goes evenest and easiest, and rides Ground the fastest.

The Horses being purchased for the Farm, according to the several necessary Labours of the Plow, the Cart, or Carriage, the next Thing to be consider'd is, their Management; and this is very easy. These Creatures which are destin'd to coarse Service, require nothing of those pamper'd Methods which are needful to the fine Horses, that are rendered delicate by Idleness. They require nothing of those Walkings and great Care, and nice Dressings, but what they do require let the Farmer see they have duly and regularly.

Let them be well dress'd, and their Bellies well fill'd: for otherwise they will never be able to go through their Tasks of Drudgery. Let their Shoes and their Backs be constantly looked to; and little or nothing more is necessary.

Let their Food be sweet Hay, or of other common Kinds, single, or mix'd together, according to the Owner's Convenience: once in a Week or ten Days let him always give them some warm Grains and Salt: this will keep them in Health: for they will escape most of the common Disorders of Horses, by their constant Exercise and Labour, with this little needful Care.

For what may be farther needful, according to the particular Circumstances and Condition of the Horse, I shall in a few Words observe. That if bleeding appear requisite, Spring or Fall is the Time, or both. If there be Danger of any Disorder about his Head, it is good now and then to burn a little Frankincense under his Nose, when he is about to lie down at Night. In the Heat of Summer it is very good to take a labouring Horse into deep Water, and swim him now and then.

It will do no Horse any Harm to be bled every Spring and Fall; but if once this be made into a Custom, let it be regularly observed: for so sure as it is omitted he will have some Disorder. Nature expects these artificial Discharges, if they have been brought into a Custom, as regularly



as if they were her own, and can no more do without them.

A fat Horse should drink often, and but a little at a Time; but if an Horse be lean let him drink as he pleases.

A great deal of rubbing does a great deal of good: every Horse likes it, and every Horse is greatly benefited by it. A Horse should always be turn'd to Grass once a Year; for it cools his Blood, scours off all foul Humours, and prepares his Stomach to receive the full Nourishment from his other Food. Nothing tends so greatly to the preserving the Husbandman's Cattle as this; nor is there any thing so prejudicial to them as the Omission.

### CHAP. III.

#### *Of the Saddle Horse for the Husbandman.*

I HAVE cautioned my Farmer, in the preceding Chapter, not to put a Saddle on the Back of his labouring Horses; therefore, as his Occasions will necessarily take him frequently on Horseback, he must keep one or more particularly for that Purpose; and I shall not leave him him defective as to the Kind and Management of that Creature.

Neither need the Horse, though bought for this Use, be strictly kept to that only: he may be serviceable on many Occasions: the Draught, or Load Horse, must not be taken from his Work, because it spoils his Pace, but there are many little Services for which the Saddle Horse will do, when he is not requir'd for that Use; and it will do him no Sort of Harm to take him to them as Necessity requires.

In the Choice of an Horse for the Saddle, let the Husbandman observe to get one of as good a Shape as his Price will afford; for it is a general and a very good Rule, that the Value of a Horse for the Road may be judg'd of by his Truth of Form.

Let him see that his Head be lean, his Eyes prominent, or full; and his Neck well rais'd. Let his Chine be also well risen, his Joints strong, and his Rasterns short and strait, and so strong as not to bend in his going: and let his Hoofs be sound, tough, and hollow.

Last of all let him examine his Temper and Disposition. In this he should be moderate: too dull a Jade is as bad as a run-away. The Husbandman wants his Nag for Service, and let him chuse him such as will do his Business freely, without continual whipping and spurring; and yet will not be eager to go on when there is no Occasion.

This Care having been taken in the buying of the Horse, the next Concern is the feeding of him. His general Food should be fine Hay in Winter, and sweet Grass in Summer; and to these are to be added dry Oats, Beans, Pease, or Bread, according to his Stomach or Occasions.

When he is upon Exercise let him be watered two Hours before he is taken out to ride, and let him be rub'd, dress'd, and fed; and after this let him be bridled up, and stand an Hour before he is mounted,

At setting out on a Journey, observe always that the reasonable Method is to travel moderately in a Morning, till the Horse be warmed, and then to encrease the Speed as Occasion requires.

At Night the Horse should be watered two Miles before he comes to his Journey's End; and then let him be brought in warm: and let him be set up in a warm Stable, well rub'd and well littered.

Let him have no Meat while he is in a Sweat in any Part, but when he is dry let him be rub'd and fed, according to his Stomach and his Duty.

If at any Time the Road Horse wants Appetite, let the Rider observe to change his Food, for these Creatures love Variety as well as ourselves; and will often be tempted to eat new Meat when they would not have touch'd the old. If this do not answer, let there be a small Quantity of white Wine, Salt, and Vinegar mix'd together, and let his Tongue and Nostrils be rub'd with it. This seldom fails to recover his Appetite.

After this let the Rider look well to his Back and to his Feet. Let him see that the Saddle does not gall, nor the Girths pinch him; and that the Shoes be large enough, and that they sit fast and easy.

These are the Directions necessary for the managing and preserving a Road Horse, in Condition to do his Business. I have set them down at large, that the Husbandman may fully understand what he is to do. The less the Business in long Journeys, the less of this strict Care is necessary: but let it be proportioned to the Duty. 'Tis always well to know the whole that may be necessary; and too much Care never did a Horse Harm.

### CHAP. IV.

#### *Of the breeding of Horses.*

WE have shewn what is the Husbandman's best Practice in Counties where it is usually necessary to buy Horses, whether in the Colt or at other Ages; but when he is situated in a good breeding Country, there is nothing whatsoever which he can practise to more Advantage, than the doing this, both for his own Service and for Sale.

We shall therefore lay down here such Rules as may be necessary to be observed in this Matter, and although the immediate Purpose be no other than the breeding of Horses for the Service of Husbandry, and the coarser Employments; yet, as the Farmer may sometimes step a little beyond these strict Bounds to his Advantage, we shall not so exactly confine our Instructions to them, as to discard totally the rest.

The first Consideration that is to fall under the Husbandman's Thoughts who is inclined to breed, is that of his Ground, for though he live in a good breeding Country, yet every Part of it may not be suited alike to that Use, and his own Lands in particular may not be convenient for that Purpose.

The Ground that is proper for the breeding of Horses,



Horses, is to be of a middle Value between the best and the worst. Horses are a very valuable Commodity, but let not their Price at a proper Age, and of a good Kind, tempt the Husbandman to enter rashly upon his Design. Horses are subject to many Accidents and Casualties; and at best they are a long while in rising to their Value: therefore let him first consider whether he cannot make greater Advantage of his Ground in the common Way of his Employment, for it is very likely that he may. If it appear that he can, then his Land is too good; and he should for that Reason drop his Design: on the contrary, he may be possessed of Grounds which as they will not produce much any other Way, so they may not be rich enough for this. In that Case he is also to drop it. In the one Instance it is not worth his while; and in the other he cannot accomplish it: both these are very sufficient Reasons for desisting.

It has been observ'd already, that the Condition of the Husbandman's Grounds which should tempt him to have Mares for the Sake of their Breed, is where the Pasture Land bears an over-proportion to the Arable: but we see by the last Observation, that a certain Condition in this Pasture Ground is also requisite. If it be very rich, it will yield more Profit other Ways than by breeding Horses; if it be very poor, on the contrary, it will not yield sufficient Nourishment; and therefore it is incapable of being put to this Use. The proper Pasture Soil for breeding these Creatures, is therefore of a middle Nature.

It should be such as yields a short Grass, but in a good Quantity: as for Situation, it should be high much rather than low; and the Soil must be such as has some Firmness, for its being hard under Foot is an Article of great Advantage. We would not be understood to mean, that an exact Attention to such a Soil as this is necessary, or that no other will do, but this is best.

There must be good Water upon the Ground; and if it be full of Mole Hills, and other uneven Places, it will be the better, because it will use the Colts while young to tread firm; and this is an excellent Article in their breeding.

A good Air is a very great Article also in a breeding Ground; but as we have already recommended its lying on an elevated Situation, this will be the more likely the Case; and further it will be needful that there be good Shelter.

Inclosed Lands of this Kind and Condition are the best for breeding, because they are warm and defended; but open and common Land may be used; only in this Case the Husbandman must be the more careful to provide convenient Shelter; and must be more than ordinary careful of the Mares just about the Time of their foaling, and of the young when it is yet tender.

When the Husbandman has a considerable Quantity of Land that he designs for this Purpose, it should be divided into several Pastures, according to the Condition and Circumstances of the several Parts of the Ground; and

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these several Enclosures should be used to these Purposes following.

The barrenest and poorest are for the Stallion to run in with the Mares: the most under Shelter, and the least subject to Accidents, are to be kept for the Mares to foal in: then the fruitfulest and richest are to be kept for them while they are follow'd by their Foals, and give Milk. Lastly, for the bringing up of the Colts after they are wean'd, the largest, openest, and the most uneven.

According to the Use for which the Colts are design'd, let the Stallion and the Mare be chosen. We have already directed what Choice should be made of Mares for the Service of Husbandry, which is our material Purpose: for any other Use they are to be selected in the same Manner, but with regard to that particular Service.

As to the Stallion, he is to be chosen according to the particular Service. The Turkish, or Jennet, is an excellent Kind for a Horse intended for the Wars: the Barb is the best for Racers; the best for hunting is the bastard Barb begot of the English; the best for the Coach is the Flemish; and the best for Travel, Draught, or Burthen, is the English.

These are Rules long ago laid down, and since that Time often disputed; but they are nevertheless maintain'd with Reason by the most experienced to this Day. Fancy and Opinion so far prevail at this Time, that it is scarce possible to find two People who will not dispute upon this Subject. However, he who observes these Rules will not repent: and, as to the material Part of our Business in this Place, that is the begetting of serviceable Horses for the Husbandman, the right English is the Stallion for that Purpose, beyond all Cavil or Dispute whatsoever.

The best Season of the Year for putting the Stallions and Mares together is about the middle of MARCH, and the Stallions should be taken away again about the Beginning of MAY. The Reason of this is, that the Time of foaling is of great Consequence: for the Foal that falls in MARCH is much more profitable than that which falls in MAY, it having the Advantage of a Part of the Cold of that Season, and the whole ensuing Winter to harden it. Experience shews, that this is of great Consequence: for the Colts foal'd in MARCH are always found to stand better, and be less liable to Accidents and Injuries than those which fall later in the Year.

The Farmer must take Care to have his Pastures in proper Order for the receiving his Horses and Mares at the Time mention'd, and for the other Purposes specified before; but he will do well to observe this Rule, not to make his Mares too fat before the Time of their running with the Stallions; for they conceive better, and hold better when they are in but ordinary Case.

It is proper to give the Mares three Weeks Rest from Labour after the Time of their conceiving; after this they may be employ'd in the common Affairs of Husbandry, but it is best not to work them too hard: the Farmer may, without any Damage, keep them thus to work

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till the next Spring; and then he should let them run loose till they foal.

I deliver this as the best Method of conducting Mares that are Breeders, but I do not say every Part of it is absolutely necessary to be observed. If the Necessity of the Farmer's Affairs require it, he may have more Work out of them than I have allowed; but if he allow them so much Rest, they will do the better, and he will have the Advantage in the Foals.

When the Mare has foaled, she should be immediately removed into the best Pasture the Farmer has, for this will make her have Plenty of Milk, and that of a good and nourishing Quality. The Foal will shew the Benefit of this, for he will thrive apace. The Pasture must not only be rich, but such as has sweet Water and good Shelter, especially if the Foal have fallen early: and it will be adviseable to let the Mare take Care of it a good Part of the Summer: if Convenience allow, it will be useful to the Foal to leave him with his Parent the whole Summer, and even the following Winter. There is a Notion that the Winter's Milk is not wholesome, but it is a weak and idle Fancy. The Farmer is to suit all this Practice to his other Affairs, but of this he may be sure, that if he can allow of it, the Foal will be the stronger and better in every Respect for running the whole Year with his Dam.

The Foal will partake of the Nature and Qualities of both his Parents, but most of the Mare; this is an Observation as old as VIRGIL; but the Horse is of great Consequence also.

Both the Stallion and Mare should be sound, if healthy Colts are expected, for they will partake of the Diseases of their Parents in both Sexes.

The Way to have large Colts, is, 1. To chuse, as before directed, large body'd Mares; and, 2. To feed them well during the Time of their Pregnancy; for the two Things that give Size to the Foal are, good Nourishment and Room to grow in. Very large Foals have been thus produced from small Stallions; and of this frequent Experience leaves no Room to doubt.

A great deal of Care ought to be taken to keep the Mares tame, and also to make the Colts at first tame in the same Manner; for otherwise the Mares often injure them while in their Bellies, by leaping Hedges and Ditches, and the Foals in the same Manner damage themselves while they are young by their unruly Frolicks. A very good Way of keeping the Mares tame and gentle, is by giving them daily some Work, for this accustoms them to be tended and handled: whereas when they run free the greatest Part of their Time, as is the Case very frequently among those who can spare their Labour, they are difficult to be kept in Order; to be removed from one Pasture to another, as Occasion requires, or to have the Foals properly tended.

A great deal of Nicety is used in the breeding Horses for the finer Employments, but 'tis the Husbandman I am directing, and he may in the Manner I have shewn, avoid the Trouble and Expence of housing his Mares, and all that Ceremony commonly practised;

and he will often have better Foals than those who observe the most exact Rules; as we see frequently, nay commonly, the Children of ordinary People more healthy and strong than those of Quality, who are brought into the World with a great deal more Pomp and Ceremony.

The Age of a Mare for breeding in the best and most advantageous Manner, is from four to twelve Years old, if she have been employ'd in the common Labour of Husbandry during the Time; but if she have been kept for breeding entirely, she may be held to it a great many Years longer.

The Age of the Horse should be from five Years to fifteen.

When Mares are kept altogether for breeding, it may be proper to bestow some more Care and Expence upon them than usually is done when they breed and work together; and it is the Owner's Business then to keep them as closely to it as may be. In this Case it is a good Method to feed them richly for a Fortnight before their foaling, which will give them Strength, and Plenty of Milk: it will make them ready also the quicker to take Horse again.

Where a Mare is thus manag'd, she may be led to the Stallion three Weeks after her foaling; and her Foal may run by her till she comes again.



## CHAP. V.

### *Of weaning Foals.*

NOTwithstanding that the common Practice is to wean a Foal at about six Months, when that falls out toward MICHAELMAS, or else about six Weeks before the Dam foals again, provided that happen in a good Season, we have advised the Farmer to let his Colt run by the Dam till she gets another: and in this we are supported by very profitable Experience: for upon the Result of many Trials it appears in general, that the Colt which has run the Winter with his Dam, is stouter and more healthy than such a one as has been wean'd at the Approach of Winter, whatever have been the Care taken of him.

The weaning of a Foal at whatever Age, or particular Time it be done, is an Article of great Consequence; and upon the proper conducting of it depends in a great Degree the future Value of the Creature. If Care be not taken in the Article of weaning, and in the summering and wintering the Colt for three Years afterwards, he will never be worth nearly what he might under this right Management.

The Colt that is to be wean'd should be taken from its Dam over Night, and driven into some warm and shelter'd Place out of her hearing: it must be fed carefully, and well in the Morning; and from that Time thoroughly attended for four or five Days: in that Space it will have forgot the Dam; and may be turn'd out to take its Chance: but Care must be taken to keep it out of hearing of the Dam for that whole



whole Summer, after which there will be no need of any particular Caution.

Such Colts as are intended for Geldings, are to be gelt at the Time of their weaning, and then the same Care serves, and as soon as those few Days already directed are over, the Part will be healed; and will occasion no farther Trouble.

After this the Colts should be separated from the Filleys, and each Parcel turn'd out apart into some open Pasture where they may have Room, and a free good Air; and may run at Liberty till they are fit to be broke for the Saddle, or for the Service of Husbandry.

Some practise the Gelding of their Colts much younger than we have here directed, and when that can be done with Convenience, it is altogether as well. They do it while they suck, and as soon as the Testicles come down: sometimes gelding them at a Fortnight old or less.

When it is done at this Time, there seldom are any bad Accidents attend it: but on the other hand, all the Damage that appears is a little swelling of the Parts after cutting; and this goes down when they have been kept carefully three or four Days, which is what we have advised to be done on Account of their weaning.

These two Methods are so little different in themselves, that the Husbandman may follow which he likes best; but if he come to a Resolution in Time, that while the Colt is very young, and is sucking, is rather preferable.

For whatsoever Service the Husbandman intends his Breed, whether for Sale, or for the Uses of his Farm; and whether he raise fewer or more, it will be of great Importance to him to observe the Directions laid down in these Chapters, relating to their breeding and weaning: that he may not be startled at the Trouble, we have made it as little as possible; cutting off all that Experience has shewn to be superfluous in the common Practice; but the little that is here set down, he is to observe carefully: for he will find his Colts the stronger and the handsomer for it; and the fitter for his own Service, or for fetching him a good Price at the Market.

## CHAP. VI.

### *Of the breaking Horses for Service.*

IT is seen in many Things that the greatest Advantages depend upon what appear to be small Matters, and is thus in the Case before us. I have given the Husbandman his Directions for breeding his Colts; but he is yet to take the Care of breaking them; and although this is a Point sufficiently regarded in Horses of the finer Kinds, yet no Article of Husbandry is so shamefully neglected, as the proper Care of first training the Horse to his several Services in that Employment.

One common Fault on this Head is, the neglecting to break them at a proper Age. The sparing a little Trouble at a right Time, is the spoiling of many a good Horse.

The Colt that is expected to turn out service-

able should be broken early, and used gently at first. The common Custom is to spoil a Saddle Horse, by making him do too much as soon as he is broke, and the usual Destruction of the Draught Horse for meaner Service is the not breaking him in time.

To avoid these common Errors, let the careful Husbandman take the following Directions. A Year after the Colt has been turn'd loose from his weaning according to our Method; that is, when he is about two Years old, let him be taken up and gently and gradually tamed. Let him be used to the Hand for another Year; and at the Expiration of that, this is when the Colt is three Years old, if he be for the Saddle let him be back'd; or if he be for Draught or Burthen let him be broke to it. But whichever be the Case, let it be done gently and gradually. Let a very little be requir'd for the first Year; and something more the second, but in Moderation; that he may be regularly brought to his full Strength and Service.

The Saddle Colt should be little more than walk'd the first Year; and seldom carried beyond a Trot the second; after this there will be no Danger of spoiling him, except by unreasonable Usage. In the same Manner let the Colt be taken up at that Age for Labour in Husbandry: but the first Year let him draw but little; and the second advance his Labour but moderately: thus he will by Degrees be train'd to know his Strength, and how he is to use it.

Gentle Exercise an Hour a Day is enough the first Year; and two or three Hours a Day the second. The Creature does not come to his Strength till six or seven Years old; and he never thoroughly comes to it at all, if he be too hard wrought while he is younger.

There is no Time nor Service really lost this Way in the Horses the Farmer breeds for his own Use; because they will stand serviceable many a Year the longer for this Care and Tenderness of them at first; so that he gets doubly at the End what he loses by his Gentleness in the Beginning; and all the Time of their Service the Cattle are stouter, and do so much more.

A Horses standing sound the Remainder of his Life, is greatly owing to the Treatment of him in the Beginning; and who would scruple to forfeit a little of this Creature's Service the first two or three Years, to keep him sound and useful all his Life. How long a Horse will continue serviceable is a Point not yet determin'd; nor indeed ever can fairly, except a due Care were taken of them at first; but as to their Length of Life, it is more than People imagine. Dr. Plot, Chap. vii. Page 37. of his History of OXFORDSHIRE, mentions no less than three Horses that he had seen in that County of about forty Years old a Piece; and the late Duke of MONTAGUE had one which was confidently reported to be not much less than fifty. It had been kept without Labour several Years; but did not seem to have been a great many Years past Service of one Kind or other.

When the Colt is first taken up, he will often be sullen and unruly; and it is a Neglect at this Age that makes the Horse vicious all his Life.

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In this Case they must be brought to Gentleness by Hunger, which will tame any thing. Let the Husbandman who has such a Colt, suffer him to have no Victuals but what he takes out of his Hand.

If this do not bring him down, let him be kept waking Night after Night; for the most unruly Horse in the World, while young, will be broke and rendered tractable in this Manner.

It is a good Method to use the Colt to Gentleness while he follows the Dam, by giving him good Food from the Hand, and the like Methods; for this will take off that natural Shyness and Fierceness which there is in every Horse, till made gentle by Use.

Another great Time of a Colt's growing unruly is, when he is first back'd, or first brought to draw. In either of these Cases the making him go in Company of other Horses is a very great Thing. When he is first rode let it be very gently, with another Horse before him, and the more about him the better; and in the same Manner, when the Husbandman first puts him to work in his Way, let him not be set to draw alone, but with others, and let his Task be very easy and of short Continuance.

It was not without Difficulty that Horses were originally broke for the Service of Mankind; and some Care is yet requisite to every one of them, at its breaking. The Colt that would fly out, and perhaps do himself or those that work'd him a Mischief, if he were employed alone, or set to an heavy Task at first; when the Business is easy, and he sees others of his own Kind about him, soon submits; and then he is easily led from the lighter to the harder, and finally to the hardest Duties.



## CHAP. VII.

### *Of the Number and working of Horses.*

**I**HAVE observed already that the Husbandman is to suit the Sex of his Draught Cattle, to the Nature of his Ground, that he may have the most full Advantage from them: he should also, in the same Manner, consider their Kind and Size, for that Sort of Horses may suit with one Farm, which will not do well upon another.

The general Consideration on this Head is, the Richness of the Pasturage, and the Size of the Cattle, for these are to be proportioned to one another. The Husbandman who has rich Ground should breed large Horses, for they will every way be most advantageous to him; and on the contrary, he whose Land is poor must content himself with a smaller Sort, except Stone Horses, if he should chuse to keep them always at Hay and Oats: in that Case he may take what Kind he pleases; but this is a Practice not at all to be recommended to the Husbandman in general.

Horses must be well fed, if they are expected to go through a great deal of Work; and large Horses will never be so upon poor Pastures. This is a fundamental Rule for the Farmer, and he must always keep it in his Memory. It is not easy to say what Number of Horses will answer

the Husbandman's Purpose, for any certain Quantity of Ground. This has been attempted, but the Differences between one Kind of Land and another, in the Degree of Labour they require, makes it impossible to determine with Certainty. Upon a general View perhaps it may be reasonable to say, that in Land of a middle Sort, about one Horse to every ten Acres will answer the careful and skilful Husbandman's Purpose. He that wants Knowledge and Management, may use twice as many, without doing half his Business.

When the Number of Horses for the stocking of the Farm has been settled as well as it may be, the next Care is the proportioning the Work among them: and on this depends a great deal of the Profit that is to be made by this Sort of Cattle.

The young ones we have said, are to be work'd but gently. They may be continually kept doing something at the Harvest, Seed Time and Fallowing, but they are never to do any thing hard. There are sufficient Articles of Drudgery in the Farmer's Business, and these he is to throw upon such Horses as will never be worth any thing by Sale. He is to keep a proper Number of these for hard Work, and though they be aged or blind they will answer his Ends, provided they are well fed. The slight Work of the others, in the mean Time, only accustoms them to their Geers, and makes them bring the better Profit upon the Sale.

The Husbandman who falls into the Method of buying up young Colts, from the breeding Counties, in order to sell them again at five Years old, must take a great deal of Care in the Choice he makes of them: for such as they are, such they will grow up: and the Farmer who breeds must, in the same Manner, be careful of his Stallions and Mares, according to the Rules given before, otherwise he may be greatly disappointed, when he comes to the Fair with them for Sale. With due Caution there is hardly a more profitable Article in his Business, for there are always Purchasers for them, and the Price, if they be well chosen, is very considerable: but I have often known the Husbandman, when he has taken a good Number of them to the Fair, forc'd to sell them for little, or to keep them on his Hands, either from his ill Choice of the Mares out of which he bred them; or from his little Skill, or little Care, in buying them when Colts.

Blindness and other Accidents will happen to Horses ever so carefully bought; or ever so carefully bred; but these must be borne with, all Dealings admit of some Accidents: we do not pretend to call that of Horses one that is more exempt from them than the rest; on the contrary, it is perhaps as precarious as any; but the more uncertain of Success it is, the more ought the Causes of that Uncertainty to be watch'd; and the more needful is a strict Observance of those Rules which may prevent the Losses that often attend upon it.

As the Horse is the first and most considerable of all the Animals that are of Service to Mankind, the strongest, swiftest, and most generally useful; it is a Creature that will naturally be of certain and ready Sale: the Variety of

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Uses in which the Horse is employ'd, will make a Demand for all Kinds, and those of all Qualities. 'Tis therefore an Article of so much Profit, and so naturally and commodiously in the Way of the Husbandman's Employment, that he should never be deter'd from meddling in it, by Accidents or possible Losses. This we may, with the greatest Truth, assure him, that his Profits in general will be certain, including all Things, and that the Degree of them will be always proportioned to those two Articles, his Skill and his Care.

By Skill we do not mean that of a Jockey or professed Dealer, for that is rather Artifice and Cunning, and may be called the Art of cheating the Buyer. It is unworthy of an honest Man; and it would take off the Farmer from his more useful Studies. We mean by Skill nothing more than a Knowledge of those plain and general Facts, laid down here in few Words; and by Care nothing more than his keeping that Knowledge always in his Mind; and acting according to it on all Occasions.



#### CH A P. VIII.

##### *Of the turning Horses to Grass, and taking them up to the Stable.*

**T**O the Rules already laid down for the general Management of Horses, I shall add some particular Cautions and Methods for the conducting that important Point, the giving them fresh and green Meat, and after that, close what is here to be said of this useful Animal.

The proper Time for the giving the Husbandman's Horse green Food, is in the Beginning of MAY, and the Time for taking him up is toward the End of AUGUST. There are several Ways of doing this, and I shall lay before the considerate Farmer, the Advantages and Disadvantages of each.

In BUCKINGHAMSHIRE, and the neighbouring Counties, the Custom is to turn out the Draught Horses in the Middle of MAY, into their enclosed Fields of Clover. This is a rank Food, but it is one that gives great Strength and Heart. The Beast does his Business in the more laborious Articles of Husbandry, more constantly and freely upon this Grass, than any other; and Experience shews that he is less liable to Colds, and many other Accidents than when fed on the finer Kinds.

In the Conduct of this Matter let me give the Farmer some useful Hints. Let the Horses be turned out first in the Heat of the Day: and if it be a wet or cold Season, let him take them in at Night, till it is dryer or more favourable.

The most healthful Practice is to work them as usual, while they are at Grass, taking them up in the Morning, and giving them a moderate Feed of Corn and Chaff, two Hours before they are collar'd; and repeating the same after they come from Work. This is of double Use, as it keeps them in great Heart; and somewhat dries the green and moist Food in their Bodies.

In HERTFORDSHIRE it is a common Practice

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to turn the Cart and Plow Horses at this Season into a Field of green Vetches, fettering them if there be Occasion, this is a very strengthening and wholesome Food.

In other Places the fresh Food is given the Horses in Racks. To this Purpose they mow the Clover, Vetches, or the like, in small Quantities, as they want it, and put it into the Racks. Lucern and Saint Foine may be cut in the same Manner with great Advantage.

Another very good Method is to sow some Ground purposely for this Use with the three Seeds of Clover, Ray Grass, and common Trefoil together; and cut it fresh for their eating in the Racks: and this keeps them in fresh and in good Heart, under the tightest Duty. In these several Methods also, by the Help of Straw, there is a great deal of good Dung made for the Service of the Fields.

This fresh cutting of Clover, Vetches, and the like, may be practised in Vale Ridge half Acre Lands, as well as in Chiltun inclosed Fields; and it is attended with great Advantage.

Let not any suppose us deficient in this Part of our Work; because we do not lay down, under the present Article, those several Methods that are prescribed in Books, and practised by Jockeys, of bleeding the Horses, and all their other Practices upon the Change of Food. It is Idleness more than the Alteration of the Diet, that causes the several Ailments into which such Horses as are bred for finer Services fall, at these Seasons of the Year. The Husbandman keeps his Cattle to their Labour; and if he does this rightly, it will answer the Purpose of Bleedings and Drenches much more to his Advantage.

In common Field Lands the Horse is stak'd down with Ropes, where he is put to eat the Grass: where this cannot be avoided the Farmer must be content; but it is a sorry Method. The Horse is necessitated to drop his Dung and Urine on the Grass; and he will not eat it immediately after. In this Case the Remedy is frequent removing of him, for he will eat the Spot on which he dung'd after a little Time, though he will not while the Taste is strong in it, and the Dung is there in Substance.

An Horse may be stak'd not only on a Piece of Grass in common Field, but also on a Piece of green Vetches, and will thrive upon it very well: but there is the Danger of his breaking loose in all these Places, and in that Case he generally does a great deal of Mischief.

In the sandy Parts of NORFOLK, and the adjoining Counties, they sow Turnep for the Summer Food both of their Horses, and other Cattle. They usually give it them in the Manger, sometimes in the Field; and it answers very well either Way. The Cattle eat it greedily, and it answers both for Oats and Hay.

They use a particular Kind of Turnep for this Use, known by the Name of the yellow Turnep. The Seed of which is sold distinctly from the others at every Seed Shop. They sow it in MARCH, and the Turneps are ready to pull at the End of MAY; and they continue sowing again and again once in six Weeks, for a constant Supply, till the latter End of SEPTEMBER; in all which Time it keeps the Cattle in excellent

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Heart, and enables them to go through their Work equally to any Food whatever.

It may not be amiss, in speaking of the Management of the Horse Kinds in these Counties, to observe a Custom they have of spaying their Filly Foals. They do this at a Month or six Weeks old, while they suck, and it is attended with no Danger. The Mare becomes a particular, and a very useful Creature; she grows large and very tough and strong withal, so that, in general, she is preferable to a Gelding.

The only Inconvenience these spay'd Mares are liable to is, the over-growing at the Joints, which sometimes makes a Weakness in those Parts; but this may be, in some Degree prevented, by spaying them when they are a little farther advanced in their Growth. A very good Time for this Purpose is just when they are taken from the Dam, when that is done at six Months, which is the Custom in many Places, for the cutting heals while they are under the Care of the Weaner.

At the Approach of Winter it is the Custom in most Counties, to take up the Horses, because the Grass becomes short, and the Season cold: but the Condition of the Creature ought to be the Rule for this, more than the Month of the Year. So long as he can well endure the Weather, and the Food answers for him, he will be much better in the Field, than in the Stable: and the saving the Expence of Stable Food is no trifling Article.

It is a good Method also to moderate between the two Extreams, by taking them into a Stable at Nights, and turning them out by Day; as the Season may require it.

Another more general Way of moderating the Matter may answer very well, in the following Manner. Let a sufficient Number of Hovels be built in the Yard: their Shape to be a long Square, the Front and Ends open, and the farther Side boarded up; and the Top cover'd with Furze, or other cheap Stuff. Against the boarded Part are to be fix'd the Mangers; and the Horses are to have Access to these when they like. Thus they run loose, or are under Cover as they chuse; and when Oats are given them they feed dry: this does not make them tender like keeping them in the Stable; and is excellent for preserving their Feet sound, and keeping them in Health and Heart, and at all Times ready for Service.

It is not understood that the Horses, in this Management, have Liberty to run any farther than about the Yard, because if they had, their Dung would be lost: whereas, in this Way, all is sav'd, and that in the most beneficial Manner possible, and the Horses escape the Confinement of the Stable, which is the Occasion of half those Disorders that they are troubled with.

As to the Manner of feeding the Husbandman's Horses, in order to make them go through their hardest Work with Ease and Satisfaction both to themselves and their Owner, the best Way is this.

In Winter let the Persons who have the Care of them be up at Five o'Clock; and in Summer at Four; and let them bait their Horses in the fol-

lowing Manner. Mix split Beans, Bran, Oats, and Chaff; or else mix Oats, Bran, and Chaff only; and give them a little at a Time, dressing them while they are eating. Bran is a very necessary Ingredient on this Occasion, because it makes the Chaff go down, and some give it all the Year, accounting that it saves Corn, and does the Horse sufficient Service, making at the same Time all his other Food taste the more agreeable.

For other Methods, half a Peck of Oats may be given in the Morning before going to Plow, and the same in the Afternoon: or after they have baited a little while in the Afternoon, a little Hay may be given them, and they may be led to water. This is a very good Method where a Horse seems to want a right Appetite, for they never fail to eat after it freely.

Chaff mix'd with the Oats is very useful upon these Occasions, and a little being given at a Time, the Creature eats it the more heartily and freely, and it digests the more perfectly.

But whatever Method be taken, let the Husbandman be sure that his Horse has Food enough; for, whatever he withholds in this Respect, is to his own Damage. He suffers more by it than the Horse, for the Creature cannot perform his Work well, nor will he be fit for Sale unless to a great Disadvantage. Many a Horse have been reduced one half of his Value, by the saving a very small Proportion of that Charge in his Food: this is frequently in other Instances also the Effect of foolish Frugality. I shall recommend the Husbandman in all Things to Economy, but let it be under the Guidance of Prudence. I have advised him to spare no Expence in manuring his Lands, because the Crop will be sure to repay it; and in the same Manner he may be sure that good feeding of his Cattle will be paid him doubly, partly in their going through their Work, and partly in their Improvement for Sale.

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## CHAP. IX.

### *Of the Ass.*

THE Ass follows the Horse in this Place, not as the next Creature in Value, for he bears in that Respect no Proportion to the Horned Cattle; but it is proper to treat of him in this Order, because he approaches in some Things to the Nature of the Horse, and is employ'd in many of the same Kind of Services.

The Ass in LONDON is the most to be pity'd of all Creatures; and in many Parts of the Country he does not fare much better. He endures great Fatigue, and his Patience is as a Virtue. This is a Creature that may be made more useful than it generally is; and that deserves much better Treatment than it commonly meets with.

A FRENCH Author has written a Treatise, to prove that the Ass is the most useful to Man of all Animals; he founds this Assertion upon its doing a great deal of Business, and being kept at a very small Expence. But altho' we shall not altogether agree with this Writer, yet we



we may with Reason endeavour to set this Creature upon a more respectable footing with Mankind, than that wherein he usually stands.

The Afs may be purchased at a small Price, as well as kept at a small Expence, and is therefore a very useful Creature to such as want the Labour of some such Animal; and yet have neither Money to purchase a Horse, nor Food to support him.

The Afs will not only do a great deal of Work, but he will bear all Sort of Inconveniencies in a surprizing Manner. He endures Fatigue, Heat, Cold, Hunger and Thirst better than any living Creature. He is liable to very few Disorders: is very long liv'd; and retains his Strength and Abilities for doing Service to a very great Age. All this should recommend this Creature to the poorer Sort of Husbandmen in the strongest Manner.

He will live upon a Common be it ever so barren, a Whisp of Straw is very acceptable Food: he will crop Bryars and Thistles; and Chaff is a Treat to him. A little more Care might very well be afforded for them than is generally allowed; and they would repay it with very large Increase of their Labour.

No Creature is better suited to carry Burthens than the Afs: it will also raise Water in deep Wells, and work in Mills full as well as a Horse, and will not stand the Owner in near the Expence of the very worst of that Kind.

But the industrious and considerate Owner may make them answer many other Purposes. We see Asses draw Burthens of Sand in a sorry Kind of Carts: ill-harnessed, ill-tended, and under every possible Disadvantage. No doubt but the Husbandman who should chuse to employ them in Draught, and would give them but tolerable Tendance, would find his Account in it in many Kinds of Carriage not yet thought of for them.

There is no Question but the Afs may be made to answer the Purpose of the Horse in Plowing; especially in light Lands: and every saving to the Farmer being so much Gain, here would be a very considerable Profit: for the worst Horses must be fed at a considerable Expence to enable them to go through their Labour.

The she Afs has also a particular Value on Account of her Milk, which is prescrib'd by Physicians for many Disorders; and in London brings a very large Price, although those who keep the Asses for that Purpose very ill deserve it, by their Manner of feeding them.

As I have mention'd the Benefits that may attend the keeping of Asses, it is reasonable also to name the Inconveniencies: and these are principally three. Their Slowness, their Stubbornness, and the Damage they are apt to do among Trees, no Creature whatsoever devouring the young Shoots so greedily.

As to their Slowness, it is a Fault they can never be expected to mend, for it is in their Nature: we are to take all Creatures with their natural Imperfections, and this is that of the Afs: but those Faults are generally attended with Advantages, as this in particular very plainly is. The Slowness of this Creature being the very Thing

that enables him to continue so long at his Labour; and undergo such lasting Fatigue; for if his Motion was quicker, he would tire like the Horse, and other Animals.

As to the second Charge, his Stubbornness and Obstinacy, 'tis certain that it is well founded, for no Creature is so ridiculously restiff as an Afs, when he is provoked beyond his Patience, which may be done; or sometimes without Provocation. Something of this may be in Nature, as well as his Slowness; but a great deal of it is owing to his ill Management. No Creature is so little regarded, or treated with such wanton Cruelty as the Afs. He is generally put into the Hands of Boys, or the worst of Servants, who certainly increase his natural Obstinacy by their Usage.

Let the Afs be taken but moderate Care of; and treated a little like a Horse, tho' it were but like the very meanest Kinds of the Horse, and if he does not become altogether so tractable as that Creature, yet he will lose enough of his natural Fault in this Respect to be render'd very useful; and will fully answer the Care that has been taken of him. This I write from my own Experience.

In the last Place, it is indeed likely that the Afs should crop and sometimes bark Trees, for they are his natural Food: but it is not particular to this Animal. In the preceeding Parts of this Work we have been oblig'd to give frequent Directions for the defending young Plantations of all Kinds from the cropping of Animals; from the Quickset Hedge to the Timber Tree. The same Care that preserves them from other Creatures, will, in many Cases, keep them also from being damag'd by this; and where that cannot be done, the Creature must be kept from them.

If the Husbandman should take a Resolution of keeping a great many Asses, he might, with a very little Care, keep them out of improper Places; and prevent this Mischief.

Among other Benefits attending the keeping of this Creature, is to be reckon'd the breeding of Mules, a Thing practis'd to vast Advantage in many Parts of EUROPE, and which it is surprizing that we have not introduced to general Practice in ENGLAND. Of this we shall treat at large in a succeeding Chapter.

As we have in some Manner recommended to the Husbandman the keeping of Asses, we shall not leave the Subject without giving him Directions for their Choice.

Asses brought from some of the warmer Parts of EUROPE, are greatly preferable to ours in Stature, and for the breeding both of their own Kind and Mules: when we see one of these Asses compared with one of the wretched Creatures of our own Country, we must naturally allow the great Advantage of giving the Afs proper Care and Management, for they are better look'd after in those Places; and their Excellence in every Respect is in a great Measure owing to that.

Where one of these Asses can be had, doubtless it is to be prefer'd; but this is a particular Case. I shall suppose the Husbandman is to chuse



chuse out of such as our own Country naturally lays before him; and among these let him select such as are bulky, and well squared. Such as have large and full Eyes; wide Nostrils; and long Necks. The Breast of an Ass should be broad; his Shoulders should stand high; and he should have a full Back. The Shortness of the Tail is also judg'd by many a Mark of Strength and Hardyness in an Ass; and so far as I have had Experience to judge, I think, with Reason.

The best Colour for this Creature is dark; the nearer black they are, usually the stouter they are found on Trial; and the Hair lying sleek, is a good Sign of its being in Health and Vigour.

Let the Husbandman who intends to supply himself with Asses for the proper Services, chuse a few in this Manner, with a strict Regard to their Age and Strength; and from these let him raise a Breed.

The best Time for covering the she Ass is in APRIL or MAY: the End of MARCH or Beginning of JUNE will do; but earlier or later than the first or the last of these it should not be.

The best Age of the Ass for breeding is five, six or seven Years: she may be used for this Purpose from three Years old to ten; but she is in her greatest Vigour, and will bring forth the finest Colts at about seven Years old.

A good stout he Ass, and a large bodied she should be chosen for breeding; and she should be wrought gently toward the End of the Time she is going.

These are short and easy Directions; and yet they will be found of great Use. The Husbandman who will carefully observe them, will be sure to find their Advantage; and if he add to this Care of breeding them, a very little tending of them when grown up, he will be able to shew Asses, if not equal to those of some other Parts of EUROPE, at least greatly superior to those commonly seen in ENGLAND: and he will by their Means do a great Part of his common Business fully as well as with Horses, and at a much smaller Expence.



## CHAP. X.

### *Of the Mule.*

**A**FTER the mention of the Horse and the Ass, naturally follows the Mule, that being a Creature produced between the two, and of a middle Nature between the one and the other.

The Mule has the good Qualities of the Ass without its bad ones. It is as patient of Fatigue, and as capable of enduring Hunger as the Ass; but then it is as tractable as the Horse; and is sufficiently swift of Foot for any common Service. When properly bred it is also a very handsome Creature: and it is indeed so well fitted for so many different Services, that nothing can be more worth while than raising them in all Places where they will thrive.

The Mule is often of the Size of an ordinary

Horse, some are sixteen or seventeen Hands high. They are very strong, and very sure footed. This is the Quality for which they are valued in many Parts of EUROPE, where the Roads are mountainous and stony; they will go with the greatest Safety over these, where a Horse would break his Neck.

They perform excellently also in Draught; and will travel many Weeks together with six or seven hundred Weight on their Backs, without any Sign of uncommon Fatigue.

The Mule is bred from the Copulation of an Ass and a Mare. Those for Travel and Shew are bred from very large he Asses and SPANISH Mares: these are tall and stately, their Colour usually inclining to black, and they are very handsome. But a larger and stouter Kind are bred from the same Asses, and large FLANDERS Mares. These are frequently seventeen Hands high, and as large set as our common Coach Horses. They are much stronger than Horses of the same Size, and will bear greater Hardships, and be fed at much less Expence. At the same Time they are much less subject to Distempers. These are great Recommendations of this Creature; and may shew how much it would be to the Advantage of the Farmer always to have them in his Yard.

They are extremely fit for the Saddle, as well as for these laborious Employments: they are very manageable, and walk and trot very easy. If it should ever become a Custom to breed them in ENGLAND, they may be suited to the Services for which they are design'd, by the Choice of proper Mares, for they take after them. Those for the Road should be bred from light made Mares; and those for Cart, Plow, and the like, from the larger bodied and stouter Kinds.

There is a very substantial Reason why we should breed them in ENGLAND, which is, that such as are bred in colder Countries, are always better and longer lived than those in hot. As to the Objection some have raised of their being vicious, it is a Complaint only made where there are but few of them, and those ill taken Care of; for where they are common, and are treated in the same Manner as Horses, they are as inoffensive.

Beside the Mule already mention'd, which is bred between the Ass and the Mare, and is a light, beautiful, and lively Creature; there is another Kind propagated in some Places, raised between the Horse and the she Ass; but this is an inferior Kind.

It has been observ'd, that Foals take more after the Nature of the Female than the Male Parent; and the same Thing is seen very plainly in the Breed of Mules: those between the Ass and the Mare, partaking of the Nature of the Mare, being beautiful, lively and swift; and only inheriting the good Qualities of the Ass, his Patience, Strength, and Perseverance under Fatigue: while on the contrary, those bred from a Horse and a she Ass, are of the Ass Kind, dull, heavy, sluggish, ill-made, and small. There is very little Temptation to breed these any where, because the others may be had with as little Trouble. Let the Husbandman therefore



therefore who shall think of breeding Mules among his Stock, take Care that he does not fall into the Mistake of supposing that 'tis the same Thing, so one Parent be of the As's Kind, which of the two it is: he here sees the Difference.

As the Mare is to be suited to the Service for which the Mule is intended, great Care is to be taken to have a proper As's. He should have all the Marks of a good one deliver'd in the preceeding Chapter, and above all Things he must be large. The fine Mules we see in other Parts of EUROPE are bred from the tallest As'ses that can be procured; which they purchase at a vast Price, and of their finest Mares. The Mare is put into a hollow Place rail'd in, and the As's has the Advantage of higher Ground in covering.

We see in this Circumstance of the Mule, the Abhorrence of Nature to Monsters, or Animals produced of mix'd Breeds. It was believ'd among the Antients, that new Sorts of Savage Creatures were every Year produced in AFRICA, from the Copulation of different Kinds, and the Increase of those Monsters so produced; but this is an Error; and we see in the Instance of the Mule, that two Creatures of a different, though like Kind, are very difficultly brought to copulate; and that when they are, altho' they produce a Creature different from either, as the Mule is both from the Horse and As's, yet that Creature is not able to propagate its Kind again.

The Pretence that there is any where a Sort of Mules that produce their own Kind one among another, is as false as the new Species of Monsters in AFRICA. The Horse and As's are difficultly got together, in order to the Production of this Animal; but when that is done, there is no carrying the Power any farther.

The Mare is always averse to receive the As's, and in the same Manner the she As's is unwilling to admit the Horse to Copulation; in so much that where they breed Mules frequently, it is a Practice to make the As's colt suck a Mare: and the Mare foal suck an As's, in order, as is imagin'd, to make them in some Degree partake of the Nature of either. This has no real Effect, but I have named it to shew how sensible the Breeders of Mules are, that those Creatures do not go freely and willingly together: and it is certain, that there is not in Nature any Power of the Mules generating its own Kind again.

## CHAP. XI.

### *Of the Bull, and his Kind.*

UNDER this general Head are included, the Bull, Cow, Ox, and Calf, each of them a very considerable Article in the Husbandman's Profession; and though all of one Kind, yet for Clearness sake, to be treated of separately and distinctly. The Cow is naturally consider'd as the principal, though the Female, because she is the most universally useful to the Farmer; but before we enter upon her

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Nature and Qualities, we shall treat of the Bull in his natural Condition, and in that of the Ox; as a Knowledge of them will best lead to the other.

In other Countries there are Bulls of several Kinds and Forms, under the Name of Buffaloes, and the like Distinctions: but in ENGLAND we have properly only one Kind.

The Bulls of ENGLAND, however, tho' they are of the same in Kind, differ in their Size, and other lesser Circumstances, according to the Counties from whence they come, or in which they are bred. The different Parts of this Kingdom afford so different Pasturage and Support for Cattle, that they are establish'd in them under certain Distinctions; and when they are brought into others, are called after the Name of the Place whence they came. Thus the LANCASHIRE breed is large, the WELCH are smaller, and the SCOTCH least of all. In STAFFORDSHIRE they are commonly black, and in GLOUCESTERSHIRE red; and they have the like Differences in other Counties.

The Husbandman who is about to stock his Farm, should be acquainted in general with the several Breeds, that he may be able to suit his Purchase to his Land.

The larger and finer Kinds are bred where there is good Nourishment, and they require the same wherever they are kept, or they will decline: and, on the other hand, the poorer and smaller Kinds which are used to hard Fare, will thrive and fatten upon a moderate Land, because it is richer than what was naturally their own.

The Husbandman will do well to remember here what we have laid down concerning Trees, that they never thrive if transplanted out of a rich into a poor Soil; and the same holds good in Cattle: let him never remove them from rich Lands to poor ones.

Every Husbandman ought to have one of these three Considerations principally in View, in stocking his Land with this Kind, the using them principally for Breed, for Milk, or for Work; and according to which of these three is his principal Aim, he is to make his Purchase: one Breed being fitter for one of these Uses, and another for another.

He is also to consider the Degree of Richness of his Pastures, that he may suit the Breed accordingly to that also. Thus if his Ground be perfectly rich, he should buy the largest and finest Cattle, the DERBYSHIRE, STAFFORDSHIRE or LANCASHIRE Kind; if poorer he should purchase the ANGLESEA or WELCH, for they will thrive and fatten upon very moderate Ground: and in the same Manner he should suit his Cattle to the Nature and Qualities of his Pasture, be they whatsoever they will.

Whatever Breed the Husbandman chuses, he is to take Care that he keep entirely to it; that is, the Bull and Cows are to be all of the same Kind; for it is a general and very true Observation, that a mix'd Race does not succeed so well in any Place, as where they are all of a Sort.

Having premis'd thus much of the several Breeds of these Cattle, on which Head we shall

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enlarge farther under the Consideration of each particular Kind in the succeeding Chapters, we shall here proceed to speak of the Bull in general: not as of any particular Kind, but of whatever; for the Marks of a good Bull, are the same in general in all the Breeds.

In the Choice of his Bull let the Husbandman guide himself according to the following Directions. Let his Forehead be broad, and the Hair upon it well frizzled and turn'd in small Curls. Let his Countenance be sharp, his Eyes large and full, the blacker the better. Let his Horns be moderately long. His Neck thick and fleshy; and his Body long and large. His Breast should be big, his Back strait and flat, his Buttocks large and square, and his Thighs round. His Legs should be strait, his Joints short, and his Hair should lie smooth and even upon his Body. This Sort of Bull answers the best in every Respect for Breed. The Oxen from him are always inclin'd to be large and stout; and are fit for draught as well as feeding.

Those who are very curious in their Breed, observe that the Ears of the Bull be rough within, that his Nostrils be wide, and his Dewlap thin, long and hairy; that his Tail stand high, his Knees be large and round, and his Hoofs long and hollow. These are Marks of less Consequence, tho' some stand upon them with great Strictness: a very good Bull may be without them; or without any Thing particular in any of these Parts; but if he answer the Description in all Points it is so much the better. The others before deliver'd are, however, of great Consequence, and the Husbandman's Interest requires him to observe them so strictly, that he should never admit a Bull among his Cattle, that does not answer to them.

The Breed in this, as in most other Kinds, partake more of the Nature of the Female than the Male; yet there is so much depends upon the Male, especially in the Form of the Ox, and most particularly when they breed that Creature to labour; that the Owner can never be too particular in his Examination of the Bull, which is to be the Father of his Breed.

The Use of the Bull is commonly understood to be only in the Service of the Cows in Propagation; and accordingly in most Places, he is suffer'd to run loose, living a quiet Life, with no Care but his Pleasures. This, however, is not necessary. The Bull is an Animal of Strength as well as the Ox, and there is no Reason why he should not be employ'd in the same Manner. This is not universally practis'd, but by an Account we have receiv'd from a very worthy Correspondent on these Subjects, who writes nothing but what he has try'd, it is very plain that it may be introduced any where with Advantage. I shall here insert his Letter as it lies before me, in his own Words, and without Addition or Deviation.

To \* \* \* \*

"Whereas you have desir'd me to let you know any Thing that should fall in my Way in the Course of Husbandry not commonly practised, I take this Opportunity of acquainting you with a Use I have found for my Bulls.

"You know it has always been my Practice to raise more of this Kind than others do with such a Stock as mine; but I fancy they generally don't allow Bulls enough to their Cows, and that the Breed suffers by it. However that be, I keep a larger Number, and feeding them separate, I seldom have any Mischief among them. But it came into my Thoughts that I might as well have some good of them beside just the Breed, and not keep so many large Creatures only for that Service. Upon this I began to think of setting one of my stoutest Bulls to labour.

"You are sensible that this is not a County any more than yours, where they put their Oxen to draught: so whether or no they use the Bulls in those Places for the same Work, I can't tell: but by what I hear, I believe not.

"I try'd one of my strongest Bulls first at Cart. We had some large Timber to carry, and I made them put the Bull to the Carriage that we used. He was a little stubborn at first, but after four or five Trials he would draw very well. I find him slow but very strong, and he answers exceedingly.

"I use him not only in the Carriage of Timber; but in drawing the Clay from the Norfield Pit, to the sandy Piece you advised me to dress with it, and he will pull a vast Load with Ease.

"I have try'd to put a Couple of them to a Cart together, but they do no better than one, for they will never draw equally. One pulls all, and the other lags, or walks easy. I have also try'd to yoke them for plowing, but it does not do. But the first Bull that I broke to drawing, works very willingly at Plow alone, and I have turn'd up my heaviest Soils with him.

"You see I write freely what can be done, and what cannot, so far as my small Practice informs me; I have computed all Things, and am convinced that it would be very much to the Advantage of Husbandry, if Bulls were made to work every where. I have been able yet only to make them draw singly, but perhaps others upon more Trial, may bring them to go together.

I am,

Your humble Servant,

R. G.

It is needless I should add any Remarks on this plain Letter. It is in every ones Power to try whether Bulls Labour answers according to this Account; and, if so, it will be worth while to try how far they may be brought to work together: not that in this Case they are of equal Value with the Ox, who, beside his Labour, has his Flesh for Market: but there is no Reason any Part of the Husbandman's Stock should lie idle. The Bull feeds, and he ought to work. Being properly employ'd he will not be at all the less fit for his Business in propagating the Species: rather the fitter.

The Diversion of running and baiting the Bull at certain Times of the Year is very old, and has



has been practised in many Parts of the World, and in most of them at the same Season. We seem to have had it from the SPANIARDS, whose Bull fights are famous; and they from the ROMANS, as the ROMANS had it from the GREEKS. JULIUS CÆSAR brought it to ROME, and he professedly learned it of the THESSALIANS. In GREECE, ROME, SPAIN and ENGLAND, the Season for it has always been in the Month of AUGUST.

The Bull is often mischievous; but it is in a great Measure owing to his being kept idle. Many a Life is lost in ENGLAND by this Creature: but probably if it should ever become a Custom to train them to labour like other Animals, there would be an End of that Mischief. The Bull is the only Creature of such Size and Power that is left to himself. If he were worked, partly the Labour, and partly the being accustomed to Mankind by their tending of him, would tame him, and make him as harmless as Horses and other Animals. They are often naturally vicious as well as the Bull; but it is their being continually in the Way of Management that breaks them.

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## CHAP. XII.

### *Of the Ox.*

THE Naturalist would smile at our treating of the Bull in one Chapter, and the Ox in another; but we know as well as he they are the same Creature under different Accidents. Their Use to the Husbandman is, however, so different, that in a Work of this Kind we are very well justified in treating of them in this separate Manner.

If the Husbandman's Land be rich, let him stock it with the largest Oxen that can be rais'd, for they are much the most profitable.

The YORKSHIRE Oxen are in general, black all over, and they are very large, firm and valuable Kind in every Respect. There are none that exceed them for Labour, and few feed like them. The Oxen of STAFFORDSHIRE, and many of the neighbouring Counties, are also of this Kind. The Oxen of LINCOLNSHIRE are in general red and white: they are very bulky, and equal to any in Value. The Oxen of SOMERSETSHIRE, and some of the adjoining Counties, are naturally red. These are also a very fine, large, and valuable Breed.

If the Husbandman intend to breed his Oxen to Draught and Labour, the black YORKSHIRE Breed is the best: if for Market only, LINCOLNSHIRE are preferable: the red SOMERSETSHIRE Ox is indifferent to either Use, and is an excellent Kind.

Of all these the LINCOLNSHIRE Breed require the richest Pasture: but none of them will thrive, or come to their Perfection, unless they have very good feeding.

The Reader is not to suppose from what is here said, that all the Oxen of YORKSHIRE are black, all those of GLOUCESTERSHIRE and SOMERSETSHIRE red, or all the LINCOLNSHIRE Oxen pyed,

These are the genuine and proper Breed of each of those several Counties; but the Graziers have mix'd them more or less in each County, though 'tis best both for Beauty and Service to keep them separate: their Kinds and Dispositions being in each Particular, as well as the Colour.

The Husbandman who intends to stock his Land with either of these Kinds, must at first buy, but he is afterwards to breed; and in order to keep up the Sort with Certainty, he must take Care to have a right Bull, and well sized Cows, both of the same Breed; and from this Stock, with a Sufficiency of Pasturage rich enough for their Support, he will not fail to have either Breed in any County: perhaps better than they are to be found in the Places themselves, as they do not take due Care there, but bring in one Kind among another.

The Oxen should be tall, full bodied, short jointed, and well put together in every Part, so that one sees their Strength. Their Hair should be fine, and lie smooth, for that betokens Health, and a good Kind.

The Strength of the Ox is very great, and he has Patience to endure Fatigue, but he is slow, and must not be put beyond his natural Pace. He will not work easily or freely, if this be attempted, and what is worse, fretting and hurrying throws him into Distempers.

'Tis but in some particular Parts of ENGLAND they now breed their Oxen to Labour, but it is very profitable. In these Places the Husbandman cannot be too much warn'd against his hurrying them in their Employments; for he should consider that they are to be fed as well as work'd; and while he makes them thus liable to Distempers, he takes them off from the one, and makes them incapable of the other.

When Oxen are to be train'd to labour, they must be first put to work at three Years old, but they must be brought to it gently, and, by Degrees, in the Manner of a young Horse; for if they be push'd or work'd too hard at this Time, they are spoil'd for ever.

Great Care must be taken to match such well as are to draw together, for otherwise they draw unequally, and spoil both the Work and one another.

In this Case of matching them, Regard must be had to three Things; their Height, their Strength, and their Spirit: for some are tall that have not much Strength; and others have a great deal of Power that are sluggish.

In general they are very tractable and gentle, but regard must be had to their several Natures, for they will not be forced out of them by any Usage; and they may be greatly injur'd in the Endeavour.

Of all the Kinds the pyed LINCOLNSHIRE Ox is the fittest for Labour. He is naturally long bodied, and till put up to feed, is less fleshy than any of the other good Breeds; tho' he takes to fattening very readily with Rest, and a good Pasture.

When the young Oxen are first put to work, a great deal of Care must be taken not to over-heat or fatigue them. They must be suffer'd to rest in the Middle of the Day in hot Weather,



Weather, and the Servant should give them some Hay, which will support them in the new Fatigue of their Labour, much better than Grass. They must be well fed during the whole Time of their labouring, for they will not do much if they be not kept in Spirits by good Nourishment; but in this let the Husbandman understand Moderation: for there is Difference between feeding them for Strength, and for fattening.

An Ox for Labour must neither be bare, nor must he be too fat; in the first Case he will be weak, and in the other he will be lazy. They should be treated gently, for they do not understand Blows and hard Usage, and may easier be beaten into Sickneses and Disorders, than into Labour.

In this Way an Ox may very well be kept to work seven or eight Years, that is, till between ten and eleven Years old; and in that Time he will do the Owner an incredible deal of Business, provided he thus understand how to manage him, for it all depends upon that; otherwise he will be as stubborn as an Ass, and will not be fit half his Time for Service.

Sometimes a young Ox will prove very stubborn, vicious and unruly; but this, when enquir'd into, will be found owing to some bad Usage at setting out, for the Ox has nothing of that bad Disposition in his Nature. When this happens he must be kept hungry; and when he has fasted long enough, he must be made to eat out of the Hand: when he is brought to his Labour, he must be tied with a Rope; and at any Time when he grows faulty, he must be cherish'd, and fed with a mouthful of Hay by hand; thus bringing him by soft Means to Quietness, and a Readiness in performing his Business; for nothing else will do with this Creature.

For the breaking a young Ox to the Field, no Way is so well as to single out one of the tamest of the old ones, that is of its own Size; and yoke them together. Let them be put to some slight Work, and suffer'd to do it easily and slowly: they will thus draw equally, and the young Beast will become perfectly familiar to it. They will be apt to get into too slow a Gait at first, but by Degrees they must be spirited to be a little brisker in their Pace; and after half a dozen Times going out with this quiet Beast, the young one must be coupled with an Ox of more Spirit, that will learn him to go quicker. Thus he is to have his Companion chang'd from time to time, till in the first Month or six Weeks of his Labour, he gets to draw with the briskest of the Stock.

This is the only Way to get the Ox to his Speed; for at best it is not great, nor will he be brought to it by force.

The Advantages of labouring with Oxen are so great, that it is wonderful the Practice does not extend farther. The Ox of eleven Years old, when he is unfit for Labour any longer, may be fatten'd as well as at any other Time; and in the same Manner if he fall lame, or by any other Accident be spoil'd for Labour, at whatever Age that happen, he may then be fed up for Sale.

In this the Ox has a great Advantage over the Horse, which, when aged, or spoiled by Accidents, is good for nothing, and becomes an entire Loss, and often a very great one to the Farmer.

The Food of the Horse is also a very expensive Article to the Husbandman, but that of Oxen is cheap. They require no Oats. They are very little liable to Diseases, whereas one is never secure of a Horse at all. But though the Ox does not require so expensive Food as the Horse, yet such as he eats must be good in its Kind, and he must not be stinted. He must always have good Grass to go to, and good Hay in Winter, else he will be of little Service: for though he must not be fatten'd in his Time of working, yet if he be not kept well fed, and in good Spirits, he is worth nothing.

The greatest Use of the Ox in the Way of Labour, is that of Plowing; and 'tis that for which they are suited by Nature. They will work at this in the toughest and heaviest Grounds as well as Horses, and do as much in a Day. They do not serve so well for drawing of Carts and Waggon; and are not fit to be used much in Places where the Roads are good.

In most Counties the Farmer would do well to train up some of his Oxen for Draught, tho' it is better not to depend upon them entirely for that Service, in any. We have shewn for what they are most, and for what they are least fitted. Every Farmer has Occasion both for Carting and Plowing; and the Horses are in general fittest for the former, and the Oxen most profitable for the latter: therefore when there are more Teams than one kept, some should be of Horses, and others of Oxen, proportioning the Number of either to the Nature of the Service, and of the Roads and the Ground. The Farmer who keeps two Teams only, will almost always find it his Interest to have one of them of Oxen, and the other of Horses.

In clayey Lands, the Oxen are most useful; and in chalky Countries the least. The Chalk soon spoiling their Feet.

It is a Custom in some Places where Oxen are used for Draught, to yoke them by the Horns, but this is awkward and troublesome. It is left off in many Places where it was once used; and ought to be in all. The common Way of yoking them together by the Neck and Breast is vastly preferable.

Whenever the Farmer comes to a Resolution of keeping Oxen for Labour, let him at the same Time provide for a proper Supply of them; and see that it be rather too much than too little, for it will always be more to his Profit to sell what he does not want, than to buy for his necessary Uses. To this End he should rear at least two Oxen and two Cow Calves every Year to keep up his Stock; and put his old, or injur'd Beasts to fatten, and supply their Places from this Breed as Occasion requires: for an Ox, as before said, whether put out of the Team for Age or Injuries, will fatten as well as at any other Time, and will bring a good Price at Market; and afford as good Beef as any other that had not been work'd.

When the Husbandman buys in Cattle to fat-



ten, it should be either in Spring, or toward the Beginning of OCTOBER. Those Oxen which are bought in early in Spring will, with proper Care, be fat in JULY, AUGUST, or SEPTEMBER, according to the Goodness of the Soil; and the Manner of feeding them; and according to the Condition wherein they were bought. An Ox that is very forward when bought in, and is turned into a very rich Pasture, will be fit for Market in ten Weeks; but there is no need that every Ox that is bought for this Purpose, should be in this forward Way; or that every one should be hasten'd to a Market Condition in that Hurry. The Care of the Husbandman in this should be, to suit his Endeavours to the Nature of his Grounds, and to the best Demand for the Cattle: he may keep on fattening the whole Summer Months, and answer his Purpose better both for the Market, and for having the best Service out of his Land, than if he hasten'd up all that he bought, or bought only very forward ones.

Those Oxen that are bought in about the Beginning of OCTOBER, will in general be fit for Sale early in the following Spring: There requires some Management in this Article of the Husbandman's Business, for without it he may lose by his Industry, but with due Care he will find a sufficient Profit in this Way. These Cattle being for Sale early in Spring, will always fetch a good Price; but the Winter feeding of them may easily run away with what should be his Profit.

The Method is to forward these in Flesh, before the Winter sets in hard; and then to take Care only to keep them up in Flesh during the hard Time, with Hay or Turneps.

They may be thus kept in a Condition for Market whenever it is worth while to sell them; and be sure of fattening up with great Ease very early in Spring, to a certain Advantage.

Another Way of buying Cattle in the Beginning of OCTOBER, to great Advantage, is to purchase lean young Oxen which will pay for their Winter Keeping by their Growth, and be ready to fatten up early in Spring, to the fairest and fullest Profit.

Another very good Time of buying Oxen for feeding is in AUGUST, or the Beginning of SEPTEMBER. These should be got forward as soon as may be, by putting them into very rich Pastures; and they will be ready for the Winter Sale.

This is the best Method the Husbandman can take, who has rich and fine Pasture Ground; for no other will support the large and valuable Breed of these Oxen. But he who happens not to have this Advantage, is not altogether to decline thus much of the grazing Business, which to the other proves so very advantageous.

Therefore he who has but moderately good Pasturage, and is inclined to deal this Way, should set about in a different Manner. Let him buy in a Number of young WELSH Heifers, instead of Oxen, in AUGUST or SEPTEMBER, and put them into the best of his ordinary Pasturages. He is to take his Chance whether these prove with Calf or not, but either Way they will answer his Purpose.

If they prove with Calf his Business is to keep them till Spring, and then he will sell them to a

good Advantage, with a Calf by their Side, for the Dairy. If they do not prove with Calf they will presently begin to fatten upon his Ground, which, though poor, is yet very fine in Comparison of what they have been used to; and he will be able to sell them out at a very good Account at CHRISTMAS or in Spring; at both which Times Meat is dear, and consequently Cattle fetch a Price.

These Heifers will, to the Husbandman thus situated, answer, in some Measure, the Purposes of Oxen; and he is not to complain they do not bring altogether such a Price; because neither the Cattle themselves, nor their Keeping, have cost him so much as in the other Instance. Such Land being cheaper than the rich and fine Pasture Ground, on which the large Oxen may be fattened.

But there is this to be consider'd, that the Advantage will be the greater, in proportion as the Farmer has the Convenience of Hay, or Turneps, which are the two Foods for Winter fattening of Cattle; and in Proportion to his Nearness to some large City, where the Demand and the Price will answer to the expensive Feeding of Hay. About great Towns they may afford to let a Beast eat a Couple of Load of Hay in a Winter, because the Demand is certain, and the Price good: but this will not do in remote Places.

Let the Husbandman who buys Cattle for fattening, take great Care in the Choice, for on that will depend a large Share of his Success. Let him examine their Bulk and Shape, and the Forwardness they are in at the Time, and after that proportion the Goodness of the Pasture to their Kind.

Those that are intended to be kept up for a Winter, or early Spring Market, must be turn'd out in SEPTEMBER into the Rowens, till the Weather become severe by much Snow or a very hard Frost; and till this Time they will not need any Fodder.

Upon the coming in of the hard Weather they must have some Hay regularly every Morning and Evening, which must be proportioned to what the Ground still affords. The more they find there the less they want of the Supply; and the less there is, the more Hay must be each Time given them.

The Frosts have an Effect upon Grass, especially upon the worst Sorts, to sweeten it. The sower Grass which the Cattle had left untouched for a great while, becomes palatable to them after two or three Nights good Frost, with a large white Ryme. They will eat this greedily; and it will make Hay the less necessary, till the Snow covers it, and they cannot get at it. 'Tis at these Times the foddering is to be largest and best, for without a due Care they will, in a little Time, lose all the Advantage they had made in many Weeks.

For those Oxen that were bought in lean, and are not got into any great Degree of Flesh by the Beginning of the hard Season, Straw will do instead of Hay: and the Husbandman must begin with Barley Straw, and then come to Oat Straw, both which are very good Food to Cattle in this Condition; and will keep them as they are,



are, and in a Readiness for any farther Improvement, when it comes upon easy Terms.

Toward the End of Winter the whole Product of the Ground that has been thus fed, will be eaten up, and then the Oxen are to be taken into the Yard. If the Husbandman have Oxen in two Conditions, the one that he feeds with Hay, and the other with Straw, they must be put up separate; and their Food must be put in Racks for them.

The Farmer often complains that his Cattle will not eat their Fodder, when they are taken up into the Yard, though they did freely when it was given them in the Field. But this is generally owing to the Folly of giving them too much at a Time. I have often seen an Ox eat heartily and freely out of the Crib for a Time, till when he had often breath'd upon it, what was left became quite disagreeable to him.

This is a Delicacy in the Nature of the Animal, and nothing can break him of it; but all the Inconvenience of it is easily prevented, by giving these Cattle a little at a Time, and often. This being, for all Reasons, the best Way of foddering all Cattle in the Yard.

Let the Husbandman take Care that his Yard be well shelter'd, and kept dry. Let there be Straw enough scattered about it, that his Cattle may lie sweet and warm, this will greatly assist in keeping them in good Case; and he need not grudge the Expence, for what the Straw is worth will be many Times over made up to him in Dung. Their trampling this Litter, with their Dung and Urine, converts the whole into a very rich Manure; and the Quantity becomes so considerable, that it is an Article of great Consequence.

When Oxen are put to be fattened on Land, they may be turned in either alone or with Horses; or they may be put into the Pastures first, and the Horses afterwards. Which ever Way is used let the Husbandman take Care of the Time of turning in his Oxen. Many think they ought to let the Grass be very well grown before they put them to feed upon it; but they are greatly mistaken. There is not a greater Disadvantage the Farmer can lie under, in this Way, than the having his Pastures too high grown before he puts the Beasts into them.

The Ox is a nice Creature, and does not love a rank Grass. In this Case they only nip the Tops, and the Remainder rots upon the Ground. When Grass is grown too high, in Autumn especially, it becomes sower, and the Cattle will not eat it freely before the Frost has sweeten'd it to their Taste.

If it happen the Farmer have at this Season of the Year, a Pasture Ground of tall Grass, the best Method he can follow is this. Let him first turn in his Oxen in a proper Number, and they will eat off the Tops; but as they will meddle with no more of it, when this is done they should be removed out of it. Horses are then to be turned in, who, not being so nice as the Ox, will eat it down lower; and after these he may feed it with Sheep, which will still find a great deal for their Purpose, that the Ox and the Horse had both left.

If the Pastures in the Farmer's Grounds be all of nearly the same Kind, and all of a proper

Grass for feeding of his Oxen, still let him frequently change their Place, removing them from one of the Closes to another. This answers a double Purpose, it gives the Cattle a Variety of Food; and it gives every Piece of the Ground Rest at Times to shoot afresh after their eating. Their Taste is so nice as to distinguish the Growth where it appears to our Eye all the same; and therefore they will be pleased with removing from one Ground to another: and each Close will shoot up with Spirit and Freshness from their cropping of it, when it is quiet for a little Time from the treading of their Feet.

Let the Husbandman always purchase as large a Breed as his Ground will maintain; and by this Management he will find it support a better Sort than perhaps he might imagine it could, or than it in Reality would do in the Hands of a less skilful Person. The Size of the Ox is a vast Article, for it makes great Addition both in the Flesh and Tallow.

Let the Ox have a smooth Forehead and a deep Belly, if he be intended for fattening. The Strength of his Joints is more the Matter when he is first designed for Labour.

In buying Oxen for fattening Preference is to be given to the young; but if they be somewhat older let the Farmer see that they are healthful. Let him feed up his own Breed for Slaughter, if he uses their Labour till the best Time of their working is over, as before directed; but let him not bring them in for fattening at that Age, without he bargain accordingly.

It is always a good Sign of Health that an Ox frequently licks himself. It is a Proof that he is in good Humour with himself, and in Spirit; for when they grow sickly, dull, and drowsy, they utterly neglect themselves, and their Coat becomes rough, and stares for want of this little Care of their own, which keeps it in order.

Nevertheless, every thing is to be understood within the Bounds of Moderation. This licking of himself, which is in general a Sign of Health in the Ox, may be a Disease. They will sometimes lick till they cannot eat, for they swallow a great many of the Hairs they lick off, and they will sometimes get together into a Kind of Ball in the Stomach, which will impair the Creature's Health. In this Case the Owner must, at Times, wash the Ox with a strong Decoction of Wormwood, which is a Taste it abhors; and finding this Bitterness on the Skin, it will be cur'd of licking; as Children are wean'd by rubbing the Nipple with Aloes.

Some, for this Purpose, cover the Creature with his own Dung, but this is a filthy Way. As the licking is always done for the Sake of Cleanliness, the Ox will often tire himself, from Day to Day, with endeavouring to get this off; or else he will utterly neglect himself, which will prove of as bad Consequence.

I am a great Friend to the easy and cheap Practices of the common Farmers, but they are not always right. This is often hurtful.

In examining how the Ox proceeds in fattening, the surest Way is to feel the hindermost Rib. If all be soft and loose about that, 'tis a Proof that the Creature is getting into good Flesh. The Part behind the Shoulders in an Ox, and the



*Of the Cow.*

They have large Cows in all those Counties where they breed the large Oxen, mentioned in the former Chapter, but the Size is not all that the Husbandman is to consider : the Quantity of Milk is not always proportioned to the Bigness

The best Time for them to calve is in the Beginning of APRIL, this is most favourable both for the Calf and for the Dairy.



The Husbandman should take Care to know rightly the Time of his Cows being to calve; and three Weeks before that, he is to feed her better than usual. She should be put into a rich Pasture, if the Season be so advanced that there is a good Growth of Grass any where: if not she must be well fed with good Hay. And this will be returned many-fold in the Profits of her Milk, which will rise in proportion to the Care that is taken to feed her well just at this Time.

When she has calv'd let her be kept that Day and Night in the House, and let the Water be a little warm'd that she drinks. She is to be turn'd out the next Day, in the Heat of the Sun if well; but she should be taken in at Nights for two or three Days following, and some Water a little warm'd should be given her before she is turn'd out in the Morning.

In hard Weather in the Winter, Cows that give a good deal of Milk, should be fed in proportion; and that should be fine Hay every Morning and Evening, when the Ground is cover'd with Snow; and at other Times once a Day, as there may be found Occasion.

When a Cow does not yield Milk enough at these Seasons, to pay the Price of a good feeding with Hay, let the Fodder be Hay and Straw mix'd; or if still worse, let it be Straw alone. But then it must be Oat Straw, for Barley Straw has a particular Effect in drying up a Cow's Milk; and if given to her in this Condition, because the Quantity she yielded would not pay for better Fodder, the Consequence would be that she would yield none after a very few Days feeding.

When the Farmer has a Scarcity of Hay, or the Price is very high, let him give the Cows which he desires to keep in Milk, Malt Dust, scalded with boiling Water. The Malt Dust swells up vastly with the Water; and when it has stood to be almost cold, it is to be given the Cow in the Manner of a Mash.

If the Cow have this at Times, she may be fed with any Kind of Straw; for this breeds Milk so well, that the other Food will not be able to dry it up while the Creature has the Advantage of its Assistance at the same Time.

About LONDON they feed their Cows very much with Grains. This is a Diet that causes them to yield a vast deal of Milk; but it gives it an ill Taste; and is unhealthful for the Cow, subjecting her to many Disorders. The Malt Dust is as cheap, and answers the same Purpose in a much smaller Quantity, and without the Danger of Illness, or hurting the Milk. It may be bought at Three-pence a Bushel, and it swells so much in the wetting, that this Quantity will very well last a Cow a Week.

In FEBRUARY, when the Pasturage is eaten bare, the Cows are to be taken up into the Cow-house, and fed with dry Meat, according to their Quantity of Milk; those which yield the most being the best fed to keep them to it; and the others in proportion.

Milch Cows should not be blooded unless there be pressing Occasions, and in that Case the Quantity should be moderate, never more than about sixteen Ounces.

The Difference there is between one Cow and another, in the Quantity of their Milk, is so great, that there can no exact Rule be laid down for their Management in Times when feeding comes dear; the best that can be said is, that in proportion to the Profit the Creature brings, should be allowed an Expence in feeding: for a Cow may be kept alive, in Health, nay and in tolerable Flesh, for much less than she can be fed for the continuing to yield her Quantity of Milk.

The Demand there is for the Milk and the Cow, and the Profit that may be at any time made by selling both, is to be consider'd; for the same Thing is worth much more in one Place, and at one Time, than another, in proportion to these Accidents.

In the Neighbourhood of LONDON there is so constant and certain a Demand for every thing, that the Cow Keeper, partly with his early and late rank Grass, partly with Hay, and partly with Turneps and Grains, feeds his Cows in such a Manner, that they are at the same Time in their highest Perfection for Milk, and at any Time fit for the Butcher. But this is not to be done else-where.

The Difference between the Milk of these Cows however, and those fed in the Country, is very great, and all the Advantage is on the Country fed Cows Side. The Grains make the Milk poor, though they yield a large Quantity.

The Price of grazing Ground about LONDON is very great indeed, but this is very well answer'd in the present Article, by the Price at which the Milk is sold. This poor Milk being sold at Three-half-pence the Quart, very bad Measure, while in the Country, but half a Day's Journey from LONDON, 'tis a Penny the WINCHESTER Quart; and in some Places the Milk Quart is full three Wine Pints, while the LONDON Quart of Milk is much less than a Wine Quart.

A Cow in a good farming Country, where Provisions are at a middling Price, is suppos'd, while in Milk, to be worth five Pounds a Year. This is reckoning her to yield about four hundred Gallons in that Time, which, with proper Management is a very decent Computation.

If the whole Quantity of Milk yielded by a middling Cow, be made into Butter, the Quantity will be about two hundred Weight a Year; and there will be a Value beside in the skim'd Milk Cheese, and in the Whey, which last serves for the feeding of Hogs. From this, which is counting at a moderate Rate, we may see the Importance of this Creature to the Farmer, especially if he take Care to keep her in tolerable Flesh all the Time, so that upon a short Notice for fattening, she may be ready for the Butcher.

There is another Use to which the Milch Cow is put in some Places, and which should be here brought to Account, that is, the suckling of Calves. A good Cow will suckle four Calves besides her own, and Grains will then be a considerable Article in her Food, for a great Part of the Year. In this Way of feeding, though the Milk be poor, there is always a great deal of it; and then, though bad for the Uses of the Dairy, it is very fit for the breeding up of Calves.

In IRELAND they compute a Cow yields for the



the first ninety Days three Gallons of Milk a Day; then for ninety Days more that she yields one Gallon a Day; for ninety more about a Quart a Day, after which she is to be allow'd about ninety Days more dry.

This is the Account of a poorer Kind of Cow than ours, and in generally poorer Pasture, and at more indifferent Feeding: but then the Price is less originally, and the Rent of Land less: so that all Things consider'd together, the Profit may be about equal.

This may be set down as the poorest Account, for no Husbandman ever needs compute lower than this, and the LONDON Account as the highest; and considering all Things, the Difference does not amount to so much, nearly as would appear at first Sight. The Husbandman in general may reckon at a Medium between them.

But there are yet some other Articles which demand the Farmer's Consideration. We have hitherto consider'd the Cow as feeding only upon natural Grasses in our Pastures; but the Custom is become very general of raising artificial Grasses, and is very beneficial: and among other Uses of these, Cows must sometimes be fed upon them.

Now it must be allowed that these artificial Grasses, as they are called, although they feed the Beast very finely, and occasion a great deal of Milk, yet give it an ill Flavour, which runs through all the Things that can be made of it, and consequently reduces their Price at Market.

For this Reason it is not advisable to feed the milch Cow upon these artificial Grasses, when there is other Food ready for her. The Husbandman should never do this upon Choice; but he may often be led to do it by Necessity, and by the Circumstances and Situation of his Farm. Now in this Case let him use his Cows not for the immediate Sale of Milk, or for the Dairy; but for the suckling of Calves. Upon a very moderate Computation a Cow that suckles four Calves, beside her own, in one Year, will be worth five Pound to the Farmer; which is much the same with her common Produce, any other Way; and if she should be able to suckle five, the Gain would be advanced five and twenty per Cent. She is much more likely to suckle five upon this Feed of artificial Grass, than any other Way; for it keeps her in Heart, as well as causing Abundance of Milk: and in this Case the ill Taste the Milk gets is no Disadvantage: for the Calves shew no Aversion to it; nor is it at all tasted in the Veal.

For the same Reason that suckling is the best Use for Cows under this Circumstance of feeding on artificial Grass, it is also advisable to prefer it to all others, when the Farmer's Pastures where his Cows feed, happen to abound in such natural Grass as gives a Rankness to the Milk. This is often the Case, where the Grass is large and rushy, or of that jointed Sort common in marshy Places. This Kind of Food yields a great deal of Milk, but with an ill Flavour, but the Calves have no Dislike to it, nor does it do any Harm to their Flesh, either in Taste or Colour.

I have said little of Cheese in the Consideration of the Uses of the Milch Cow, because

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there are some Grounds where it cannot be made to any great Account, of which more in its Place. In general, in those Counties where good Cheese is not to be made, it should be entirely let alone: in others the Profits, upon a fair Account, considering every Article, seem to be about equal to those resulting from Butter.

The Dairy requires the nicest as well as the richest Milk; and therefore, where the Circumstances will not allow of the Cow's yielding this, her Milk should be always put to other Uses. The fine Milk is the Produce of sweet Grass and good Water. Where the Food is rank, or the Water bad, the Milk will always have a Taste from it; and for that Reason, if the Pasture be ever so good, and the Water bad, it is best for that only Reason to set aside all other Thoughts, and use the Cows for suckling of Calves, if the Circumstances and Situation render that a practicable Matter.

About LONDON, where the Cow is kept in Flesh all the Time of her Milk, so that she is any Day of ready Sale to the Butcher; the Way is as soon as she begins to fail in Milk to sell her, and purchase a lean Cow in the proper milch Condition in her Place.

In the Country something like this is to be done also, tho' more Care and Time is requir'd for it.

One of the greatest Inconveniencies of sucking these Calves is, that they keep the Cow down by the Quantity of Milk they draw, so that she is not ready to go to the Bull again at a proper Season, but misses her Time. When this happens, the Farmer's Business is to fatten her up for the Butcher.

About the Beginning of MAY, or in the Middle of AUGUST, such Cows are to be turn'd into a proper Pasture for fattening, and manag'd accordingly. This will take up four or five Months, and at the End of that Time they will be of ready Sale; and if these Seasons are observ'd for turning them in to fatten, they will be fit for Slaughter at a Time when they bear a Price; for those which are turn'd in at the first named Season, are fit to kill in Harvest Time; and the others a little after CHRISTMAS.

Both these are Seasons when Beef bears a Price; and the Price for which such a fatted Cow is sold, will be enough to purchase a milch Cow with a Calf by her Side; and pay for the Time of her fattening into the Bargain. Thus the Husbandman must contrive and compute, for all Things must be taken into his Consideration, if he would make the most of his Profession. It is easy to get something by it; but he who sets to work upon it with Knowledge, will double his Advantage.

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#### C H A P. XIV.

##### *Of the Calf.*

WE have already given the Husbandman proper Directions for the Choice of his Bull, and his Cow, therefore he is so far instructed toward the breeding of the Calf. But a great deal remains to be said respecting its Management,

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nagement, for it may, in many Cases, be made doubly valuable by proper Care. In different Counties various Methods are used in raising of Calves, according to the Nature of the Demand for them; many Means being employ'd to suit their Flesh to the Taste and Eye in the Markets, of which we shall treat hereafter. There are two Ways of breeding those which the Husbandman intends to rear. The one is to let them run with the Dam all the Year; and the other is, that of taking them from the Cow when they have suck'd a Fortnight.

In the cheap breeding Counties, the first Way is the most usual; and it is commonly allow'd that it produces the fairest, stoutest and best Cattle. It is done also with least Trouble to the Owner. These are Inducements of some Consequence, but there are in many Instances others on the opposite Side that out-weigh them.

When the Calf is taken from its Dam at a Fortnight old, a great deal of Care is requir'd in raising it: but in those Places where it is the common Method, all this becomes familiar and easy by Use. They first of all warm a Quantity of flat Milk, and teach them with a great deal of Pains to drink it. There is a great Caution to be used in the Degree of Heat they give this. It is most natural when it is of the same Heat with the Milk just drawn from the Cow; and if it be much warmer, or much cooler than this, it is sure to do the Calf Harm, and often is its Destruction.

The Calf, if rightly manag'd, in a little Time gets some Strength and Hardyness, but when just weaned, and at this tender Age, it is very weak and tender.

When thus wean'd, it is to have Milk given to it for a Quarter of a Year; and at the End of that Time, in order to break it from that, some Water is to be put to the Milk, and by Degrees more and more till it be only Water, and serve for Drink, not for the sole Nourishment.

Before it is brought to this, the Calf must be taught to eat dry Food, which is to be done by putting some fine Hay in a cleft Stick, and leaving it in his Reach. This should be first put in his Way when he is about five Weeks old; and he will soon take to it; so that by the Time it is proper to wean him from Milk, he will naturally feed on Hay.

When the Calves have got some Strength and Hardyness, the Husbandman is to take his Opportunity in fair Weather, in the Middle of the Day, to turn them out to Grass; they are to be taken in at Night for about a Week, and some Milk and Water given them warm; and it is a good Custom to set a little to them sometimes in a Pail in the Field: this may be done occasionally, till they are able to feed and take Care of themselves.

Great Caution is to be used in the first turning Calves out to Grass, not only that it be a favourable Season, but a proper Kind of Pasture. It should have a short sweet Grass, with a good Body, but no Rankness.

The best Way is to wean the Calves at Grass, for when they are wean'd in the House by means of Hay and Water, they generally become sub-

ject to Disorders. The other is the most natural Method; and every Way the best.

At about three Years old; such of the Male Calves as are intended for Oxen, should be gelt. This is the Time at which they suffer least from it.

In Places where there is a quick Demand, the best Method is to fat all the Calves for the Butcher, except such as shall be necessary to keep up the Stock. This Demand is commonly largest near great Towns, where the Price of the Calf is high, and where the Grounds are not profitable to breed upon, so that it is a particular Circumstance: cheaper Countries being fitter for breeding.

As the Price of the Calf in these Places depends upon the Fatness and the Colour of the Flesh, the great Care of the Owner is to be turn'd to these two Articles: in the which if he succeed perfectly, his Calf will fetch as large a Price as a good Heifer. In order to make the Calf fatten, and have a white Flesh, the common Method is this. They keep them extremely clean, giving them fresh Litter every Day, spreading the new upon the old; and always keeping a Couple of large Lumps of Chalk hung up in Corners of the Coop, in their Reach; and where they cannot foul it by treading upon it, or by their Dung or Urine.

The Calf will be continually licking these Chalk Stones, and their Whiteness communicates itself to the Flesh throughout his whole Body.

Another Care is, the proper building of the Coops in which Calves are to be fatten'd: the two great Considerations in these are, the keeping them cool and dry. For the first Purpose they build them in Places where there is little Sun; and for the other, they raise them three Foot from the Ground, so that the Urine and all other Moisture naturally runs out.

When the Calf is in this keeping, well fed, and carefully look'd after in every Respect, it is twice at least blooded: once of these Times is at about five Weeks old, and the other Time a little before it is killed.

When a Calf purges, the Custom is not to let it suck altogether, for the Milk of the Dam often throws it into this Disorder, which certainly wastes its Flesh. In this Case they give it Milk with Chalk scraped into it, which has a double Effect; stopping the purging, and throwing more of the whitening Matter into the Flesh. They scrape the Chalk very fine for this Purpose, and after mixing it well with the Milk, they pour it down the Calf's Throat with a Horn.

Often it happens that this will not remedy the Disorder, and the Calf is like to be spoiled. In this Case they use the Cold Bath for it; and give it some Bole Armenick, and Chalk mix'd up with Milk into Balls.

If this does not answer, they know not what to do farther. But I have found that in the worst Purgings to which these young Creatures are subject, a small Dose of Diascordium made without Honey, mix'd with Port Wine and Water made warm, and given with a Horn, will do more good than all their Remedies.

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The Calf must not have any Milk for three Quarters of an Hour before, nor an Hour after this Drench, but it may lick as much Chalk as it pleases. If this does not answer in the first Dose, another may be given twelve Hours afterwards, and this rarely fails. The Quantity to be given each Time is a Dram. This never hurts the Colour or Taste of the Flesh.

This Purging is the most common Disorder the Calf falls into, but it may be disordered in the other Extream, and that is full as bad. If it be costive, the Flesh of it will never be delicate. When any Tendency to this is observed, the proper Method is to give a little Manna; and the best Way of giving it is this: buy about an Ounce of ordinary Manna, which they sell at a small Price at every Druggists; dissolve it in a quarter of a Pint of Water, and add a Spoonfull of Brandy. Thicken up this Liquor with fine Wheat Flower, and make it into Crams, give the Calf three or four of these every Morning after he has been sucking, and dip them in Milk to make them go down. Repeat this till the Calf is right in this great Respect; and then leave it off.

These, as they are properly speaking, Medicines for the remedying of Disorders, might have been reserved to their Places in this Work, in a succeeding Book, but as they immediately concern the Management of the Calf for Slaughter, I have set them down in this Place, not willing to give the Reader the Trouble of a needless Reference to another Part.

The Manner of bleeding Calves is this. The first Time it should be done in the Neck, and Care must be taken not to draw too much. The second Time it is best done by cutting off a Piece of the Tail, and if this do not bleed so much as might be expected, it may be repeated at two or three Day's Distance, by cutting off another Piece, which will bleed just as the former.

One very useful Effect the Chalk given to Calves has, beside the whitening, which is, preserving the Flesh, for it keeps it dryer than it would otherwise be, and the Wetness is what makes it so soon taint.

The Cow is subject to great Irregularity in breeding of her young. Very frequently there are Parts of a second Calf growing out of the first; and these monstrous Productions are shewn about for their Curiosity.

Nature often is so abundant in this Species, that the Young come by Twins: and we have Instances of Cows that have, for several Years together, always brought forth two Calves at a Time, as if it were the natural Condition of the Animal. Dr. Plot, in his natural History of STAFFORDSHIRE, tells us of a Cow at DUNSTALL, in that County, that for three successive Times brought forth two Calves each Time, and a third Time three. Thus having no less than nine Calves in three Years Time.

The Bull was doubtless the same to this Cow, and to many others, which we do not find recorded upon this Account, as having brought forth their Young in any particular Manner; whence we may naturally infer, that in the Case of Twins in our own Species, as well as other

Animals, the Cause of them is in the Female more than the Male.

One would not build such a Supposition upon a single Instance, but the same Author tells us of another Cow that had successively three, two, two, and then three again, so bringing ten Calves in the same Space of Time as the other nine: and it appears from Observation, in almost all these Instances, that the Creature who thus brings an abundant Number of young at any one Time, continues to do it.

MORETON, who in his History of NORTHAMPTONSHIRE, mentions Instances of a like Kind, adds, that when the Twins are one Male, and the other Female, the Cow Calf, if it be brought up, is always barren. In that, and in some of the adjoining Counties, they shew a Kind of Cows which they call Free Martins, they have large Horns like an Ox, and they say they partake of both Sexes. These are said to be the Cow Calves where there have been Twins. And they add, that when the Twins are both Female, they are prolifick like other Creatures of the same Species.

I have set down these Articles which are Matters of Curiosity, merely for the sake of farther Enquiry. These Writers are too apt to take Things upon Report, and we know how idle many of the Stories are, which are confidently and universally propagated among the Farmers in most Countries; and believ'd by the Vulgar, because they often hear them.

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## C H A P. XV.

*Of Sheep, and the several Breeds in this Country.*

**N**EXT in Value and Consideration to the larger of the Horned Cattle comes the Sheep; an Article of vast Concernment to the Farmer: cheap in the Purchase; easily fed; and returning a great Profit by many several Ways: even its Dung upon the Land often paying for all it eats while fed upon it.

We have already advised the Farmer in the Choice of his larger Cattle, to proportion their Kind to the Degree of Richness in his Land: it is not the Fortune of every Husbandman to labour upon a fruitful Soil: but the worst is not without its Uses; and Sheep are a Stock for such as will not support the larger Kinds. We see them thrive upon the most barren Downs; and the Farmer will always find them ready to fatten upon such Grounds as will not keep the other Kinds alive.

As the Oxen of ENGLAND are of very different Breeds, though all the same in Kind, so it is with the Sheep, which differ extreamly according to the several Breeds in different Places; and are therefore suited one to one Kind of Land, and another to another.

We shall advise the Husbandman to great Caution, in the stocking his Farm with Sheep: and this under two Heads, first, with Respect to the Breed, and secondly, for his Choice of the Creatures themselves; for there are, in every Breed, many that are much finer than others, and



and these he should chuse: Half the Profit that might be made by this Part of the Husbandman's Stock, is lost by Carelessness in the first Choice, and in the following Management: but an Error in the first Choice is the most fatal, because it is irrecoverable, except by beginning over again. We shall therefore first consider that, and laying before the practical Husbandman the Properties and particular Uses of the several different Breed of Sheep that we have in ENGLAND, shall advise him in his Choice according to his main Design, his best Advantage, and the Nature of the Land he has to stock with them.

With respect to the Fineness of the Wool, there is a small Breed, distinguished by their black Face and thin Coat, that exceed all others. They bear but a small Quantity in Comparison of many, but the Quality of it makes Amends. These are easily known by Sight. They were first rais'd in HEREFORDSHIRE and WORCESTERSHIRE. And for that Reason are known in many Places by the Name of the HEREFORDSHIRE or the WORCESTERSHIRE Breed. A dry, barren, and exposed Pasturage will very well feed this Kind, for they are hardy; and the shorter the Grass on which they feed, it is observ'd the finer the Wool. They are also excellent for the Table, the Joints being small and full of a fine Gravy. We see this Kind kept in many Parts of ENGLAND, in Gentlemen's Parks and Lawns, and they every where make a pretty Appearance.

The Kind most opposite to these are a large, tall, and heavy-loaded Sheep: these have strong Limbs, and a stout Gait in walking: they carry a great deal of Wool, but it is coarse. These were first bred in LINCOLNSHIRE, and in some of the adjoining Counties; and are fond of living in Salt Marshes. They have been taken into many Parts of the Kingdom, to other Ground, where they do not keep entirely to their own Nature: and yet are called from the Place whence they were brought, the LINCOLNSHIRE Breed.

The Flesh of these is large grain'd, but moderately tasted, and nowhere very much esteem'd. However, as they are observed to succeed better than the other Breeds, in Places toward the Sea, it may be proper for the Husbandman who has Land in such a Situation, to take some of them: though not for his whole Stock in this Kind.

Thirdly, there is a Breed between these two Kinds, which in general should be prefer'd to either. This is a large, tall, and strong Sheep, of the best Shape of any, and having the deepest Coat of Wool. This was originally fed in several of our midland Counties, and has thence been called by some the Midland Breed; and by others, from some particular Counties famous for them, the LEICESTERSHIRE or NORTHAMPTONSHIRE Breed. The Wool of this Kind, though not altogether so good as that of the small black faced Sheep, is greatly preferable to that of the LINCOLNSHIRE Breed; and the Quantity is so much greater than that of the smaller Kind, that it very well makes amends for its inferior Quality.

The Flesh of this Sheep is the common Mutton, not in any thing particular for Goodness or Badness: and it will do very well upon the com-

mon Pasture Grounds, and thrive upon every common Kind of Food. For these Reasons it is fit that these Sheep should be most generally bred.

When the Husbandman has very poor Pasture Grounds, let him take the HEREFORDSHIRE Breed; and when he borders upon the Sea-Coast, or upon the Shores of large Salt Water Rivers, let him prefer, in Part at least, the LINCOLNSHIRE Kind: but when he has none of these particular Reasons to byass him, let him prefer this midland Breed to any other.

To these three, which may be call'd the general Breeds of Sheep, I shall add a few Words on two other Kinds.

The Sheep bred in the Northern Parts of this Kingdom, are a large and big bon'd Sort; they approach to the LINCOLNSHIRE Kind in Shape; but their Wool is harsh, rough, and hairy, these are called by some the YORKSHIRE Breed.

Their Flesh is inferior to that of several other Kinds, as well as their Wool; but they have an Advantage over the others, in that they will stand the coldest Weather, and take Care of themselves where some of the tenderer Breeds would be lost. This may recommend them to the Husbandman whose Lot has thrown him far North, where the other Kinds will not thrive; but he should not introduce them into his Farm in any other Situation, for they are less profitable than any others.

The last Kind, or Breed, to be mentioned, is in a Manner peculiar to mountainous Countries; and is most frequent in WALES. It may therefore be called the WELCH Breed. This is a small, but well-shaped Sheep; and so hardy that it will live any where. The Flesh is excellent for the Table. But the Wool is not only small in Quantity, but is the worst produced by any Breed of Sheep in this Country.

The Husbandman will see by this Account, that it never can be his Interest to admit this Breed among his Stock, unless compelled to it by the Particularity of his Situation. The little black fac'd Sheep of HEREFORDSHIRE has the same Advantage in the Excellence of its Flesh; and it has, into the Bargain, the finest Wool in the World. Therefore it is highly to be prefer'd, where it will thrive: and it will do on very poor and very exposed Ground. However, if at any time the Farmer finds his Pastures so poor, so exposed, and miserable, that they will not support this Kind, all he has to do is to call in the other, or WELCH Breed, which will live any where.



## CHAP. XVI.

### *Of the Choice of Sheep.*

HAVING laid before the Husbandman this Account of the three principal different Breeds of Sheep in ENGLAND, and the two other Kinds that are, in a Manner, particular to certain Places, the next Part of our Care must be, the instructing him in his Choice, not only of the Breed he shall fix upon, for the Grounds of that Choice have been laid down already, in their several Characters; but of the particular Creatures he



he shall fix upon in the Breed that is most suited to his Purpose.

But to this Particular let us premise a few Words upon his general Choice, that is, as to the Breed. He sees here five several Kinds of Sheep, some large, others smaller; and some yielding a greater, some a smaller Quantity of Wool, which is also on one Breed fine, and on another coarser. He has his Choice given him among all these, for we suppose him not yet to have begun stocking his Farm with this Article: it would be natural for him to prefer at once the finest Kind as most profitable; but let him not only remember, but strictly observe what we have just laid down, that every Breed will not suit every Pasture.

He has now seen what are the Kinds of Sheep: let him examine what is the Nature of his Land; and when he has impartially consider'd this, let him fix upon that Breed which will thrive best on that Kind of Pasturage he has at his Command, for this we have expressly told him with respect to each; and let him then purchase for his Farm that Breed which he sees will be most suited to thrive on it.

This he may be assur'd of, and he may extend the Rule farther than barely to his Sheep, that he will have more Profit from the very worst Kind that shall thrive upon his Land, than he possibly can from the very best that shall starve upon it.

One Thing farther is to be noted before we come to the particular Choice, that is, the Difference of the Land which he is to bring them to from that whence he purchased them: this must be in this Respect, as has already been caution'd upon other Articles, always in Favour of the Land to which they are brought; for any Breed whatever will decline upon being brought from a richer Pasturage to a poor one.

Let the Farmer therefore see that he buy not only a kind suited to his Grounds; but that he buy them from a worse Land than his own, because upon that will depend their immediate thriving.

Having thus settled the general Points, let him proceed to the Care he is to use in the Choice of each particular Sheep.

Whatever Breed they are of, let him observe that what he purchases are stout, hearty, well made, and big boned: let him see that the Wool of whatever Kind or Depth, be soft to the Touch, and seem fatty in the handling; and that it be clean and well curled.

Sheep of this Condition, whatever Breed they belong to, always bear the largest Quantity of Wool according to their Kind: and these are Marks also that make them bring a Price at Market. The Butcher has his Rules for judging as regular as the best Farmer, and these are the Things after which he principally enquires to settle the Creatures Value.

In the last Place, we are to give Directions for the Choice of Sheep to breed. This is a very material Article, and must be well regarded. Let the Farmer chuse his Ram by these Marks; let him be young, handsome, and well shap'd, of whatever Breed, see that his Wool be clean and grow well; and let the Skin under-

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neath be of the same Colour. Let his Body be large and long; his Forehead broad, round and rising. Let his Eyes be large and of a cheerful Aspect; and his Nostrils strait and short.

The Sheep without Horns, which are called the polled Breed, are accounted the best Breeders; this is establish'd upon so long and repeated an Experience, that the Farmer needs not doubt it.

In the Choice of the Ewe for breed, let her Neck be large and upright, naturally bending like the Neck of a Horse. Her Back should be broad, and her Buttocks round: her Tail should be thick, her Legs small and short; and her Wool should be thick and deep, and should cover her every where.

Of all Things let the Purchaser take Care that they be sound, and, to know that, let him examine whether any of the Wool be wanting: let him see that the Gums be red, and the Teeth white, the Felt loose, but the Wool firm, the Breath sweet, and the Feet not hot.

With respect to the Age, two Years old is the best Time to have them at. They will bear good Lambs till they are seven Years old: and their Age is to be known by their Mouth. When they are one shear they have two broad Teeth before; when two shear, they have four; when three shear, they have six; and when four, they have eight: after this their Mouth generally begins to break.

By this the Purchaser will be able to guess at the Age of his Sheep; and, as to their Condition, nothing shews it more than the Dullness of their Eyes, and the Looseness of their Wool. If these Marks be upon them, let not the Farmer purchase them by any Means, for they will never stand.

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## CHAP. XVII.

### *Of the breeding of Sheep.*

THE Rams and the Ewes being chosen for breeding according to the foregoing Directions, the Husbandman is next to consider what will be the best Time for putting them together. In this, as in other Respects, let it not appear that I lay more upon his Mind than I need. It is true that a great deal more Care is here recommended, than usually is taken by Country People on most Occasions; but not more than is proper or requisite. The Principle on which I have set out in this Treatise is, that the Husbandman by Industry and Knowledge of his Business, may obtain much larger Profits than the common Run of Persons in this Business are content with; therefore although less Care, and less Foresight than is here recommended may do; yet he who uses the most will have the largest Gains. I expect my Farmer in every Article of his Business, to consider the Event before he fixes upon the Means; and always to have the End in his Eyes when he is about to make a Beginning.

Thus in the present Instance, before he puts his Rams and his Ewes together for breeding, I advise him to compute the Time of their go-



ing with young, and so to know when his Lambs will be brought forth. When he has computed this, let him see whether it will be a convenient Season for him; and which will be best. Let him consider at what Time of the Spring his Grass will be fit to maintain the Ewes and their Lambs, and then put the Rams and their Females together so long before, that will bring the young out at a proper Time.

Let him consider whether if they fall early he shall have Turneps to support them till the Grass comes: for I have often seen very great Mistakes in this Reckoning: and many a Time the Husbandman, for want of due Care in this Respect, has lost both his Ewes and his Lambs for want of due Food.

The prudent and considerate Farmer is to take Care before he puts his Sheep for breeding, he is sure not only of a Support for the young and their Dams when requir'd; but that it be a sufficient and good Food for them. That which will keep them alive oftentimes, will not be sufficient for their thriving. There must be Plenty of what is good in its Kind, for if there be a Defect in either Quantity or Quality, the Lambs will be stunted at first, and this is an Accident they very difficultly recover afterwards.

The Time of the Ewes going with Lamb is twenty Weeks, and the best Season of the Year for them to yean is, toward the Middle of APRIL; except where there is very forward Grass or Turneps. But if on any Occasion from the Circumstances of the Farm, or any particular Consideration, it is necessary to have them yean much earlier, they may be put together so as to come in JANUARY or FEBRUARY.

In this Case there will require a great deal of Care to be taken of the Lambs for some Time. All Lambs are very tender when first brought forth, and if they are not tended, the Magpies, and other Birds will peck their Eyes out: but the Coldness of the Season keeps such as fall in JANUARY or FEBRUARY tender and weak much longer than those which are brought forth at a more advanced Time in the Spring; and therefore a nicer Care is requir'd to breed them up; and it must be continued a longer Time than on the other Occasion.

As to the Land to breed Sheep upon, when the Farmer has Variety, and can take his Choice, let him observe these several Qualities in the different Kinds, and conduct himself accordingly. A rich Pasture breeds well shap'd and tall Sheep, according to their Kinds; and such as have a short Grass breed a lower but well set Sheep. Those which are bred in mountainous or woody Places, are commonly small limb'd and low.

In general, dry Pastures are the fittest for this Purpose: all wet Grounds, and such as are liable to be overflow'd, being hurtful; excepting only the Salt Marshes, which, for the proper Kinds, succeed very well.

The Farmer should keep all this in Mind, but at the same Time remember, that these Rules are subordinate to those more general ones, which have been deliver'd already. The Breed of his Sheep is the great Article of Consideration in respect of their Size, and he has

already been inform'd what Breeds suit what Lands: those more essential Considerations being kept in Mind, these lesser ones are of great Use.

Let the Farmer who is about breeding of Lambs, save the Grass and Weeds that grow in the Lands he designs to fallow in Winter, that is, from CHRISTMAS; and let him turn his Ewes and Lambs into them in MARCH. If there be a mild Winter, this will be a great Help to them.

When Sheep are to be turn'd into Wheat or Rye to feed, the Farmer must take Care it be not too rank before they are put into it, for in that Case it gives them Purgings, and other Complaints.

No Cattle whatsoever should be fatted while they are going with young, for nothing is more dangerous to them: they should therefore be kept upon a moderate, or rather poor Pasture all the Time they run breeding, except the three last Weeks. This is a Rule to be more carefully observ'd with Sheep than any other. If they be fed too high the whole Time, it will go hard with them in yeaning; but if they are not put a little into Heart before they come to it, they will want Strength; and they will also want Milk for the Support of the Lamb.

The proper Time of weaning a Lamb is at four Months old: but in general there need no Care or Caution to be used at all. In most Places where Things are properly manag'd, Nature does this, and the Owner knows nothing of it: in some Pastures it is also the Preservation of the Lamb to keep sucking.

When the Farmer has Plenty of good Grass, and his Rams always run with the Ewes, he need not give himself any Trouble about the weaning of the Lambs. The Ewe will in this Case go to Ram at a proper Time of her own Accord; and she will then become dry, and the Lamb will be wean'd naturally.

In such Pastures as are subject to give Sheep the Rot at certain Times, it is always best to let the Lambs run by the Ewe; the longer the better. These tender Creatures are more ready to come to harm than the full-grown ones in those unsound Places: and sucking is the best Preservative against it: for they are seldom found to fall into that Misfortune while they have Milk.

If the Farmer have suspicious Pastures, and finds that his Lambs want Milk, it is best to sell them at once to the Butcher: for it is not the running by the Ewe that will preserve them, she can be of no Service against such an Accident, if she wants Milk for their full Support.

Those he Lambs that are intended to be bred as Rams, should be separated from the rest, and the others gelt in Time. The sooner this is done the better: for every Creature bears this Operation best while it is tender, and is with the Dam.

If this Operation have been neglected at a proper Time, it must be done toward the End of SEPTEMBER, at which Season it is best to separate the Breed for this Purpose, and see it be done perfectly.



## C H A P. XVIII.

*Of the sheering of Sheep.*

WE come now to a very considerable Article in the Value of Sheep, that is the Wool; and this, like every other Part of the Husbandman's Profits, may be enlarg'd greatly by due Care and Management.

There are two Articles in the Condition of the Wool which enhance its Price. These are Fattyness and Cleanness. And it is in the Owner's Power to give it these in a much greater Degree than they otherwise would be, by his Care and Attention. The first will be increased by the Time of shearing the other by Cleanlyness.

The Fattyness of the Wool will never give it any Value, unless it be at the same Time clean; and the Cleanness will discover its Imperfection, instead of enhancing the Price, if it be not fatty.

This Fattyness of the Wool is owing to the Creatures sweating, and therefore there must be some hot Weather past before it is shear'd, that it may have sweated well: not once or twice, for that will answer no Purpose: but several Times for Days together, that the Moisture may have lodg'd itself about the Wool, and in a Manner oiled it so, that the necessary washing of the Creature for Cleanlyness, shall not be able to carry it off.

Unless the Sheep have sweated well before the Washing, that will do harm equal to its good, for as much as it increases the Price by Cleanness, it diminishes it by taking off the Fatness. It is very necessary Sheep should be well wash'd before they are shear'd: but the Farmer is to know at the same Time, that unless they have well sweat in their Wool first, this will hurt it.

Upon this Foundation depends all the Art of Sheep-shearing. The best Season of the Year for doing it is toward Midsummer. But let the Weather determine, and let not the Farmer be carried away by the Name of any Day, or Month, against the Use of his Reason.

JUNE has been commonly made the Month for Sheep-shearing; for this plain Reason, that at this Time of the Year there commonly has been some hot Weather to sweat the Sheep; and there follows hot Weather after it. But as this is the Reason why JUNE is proper, if any Year the Season prove very cold in the first Part of Summer, let him defer it till JULY; and, on the other hand, if very hot Weather come in early, let him go to shearing in the End of MAY.

In general, if the End of MAY be hot, he is to begin early in JUNE; and if the hot Weather have not come in till the Beginning or Middle of JUNE, he is not to shear his Sheep till the latter End of that Month. And in this Manner let him who would succeed well in the Husbandman's Business, conduct himself in every Article. Let him know the Practice of others according to the common Rules: but let him

examine the Reason of it in every Article; and while others follow it blindly, let him pay his Submission to it with Discretion. I would not have him set himself up as an Opposer of the common Methods, unless where they are palpably wrong; but understanding their Origin and Foundation, he will often find it convenient to depart a little from them; and will always find the Advantage of that Liberty when it is founded upon Reason.

When the Husbandman has on these Principles settled the Time of sheering his Sheep for that Year, whether it be the End of MAY, the Beginning, Middle, or End of JUNE, or the first Week in JULY: for it ought not to be later than that for many Reasons; the next Care is to prepare for it by settling the Time of washing them, and giving them Opportunity to dry themselves clean.

For this Purpose the Place of washing is to be fix'd upon, and a Piece of clean and dry Ground in which they are to run till they be dry'd, and where they can't get fresh Dirt. For Convenience Sake this Piece of Ground, and the washing Place, should be as near one another as may be. So if the Farmer have his Choice of two or three such Places, let him prefer that which is nearest the Water; and if he have but one, and have good Convenience of Water, then let him make the washing Place in the Spot nearest of all to this Ground.

Though it is very needful that the Sheep be wash'd before it be shorn; yet it must not be shorn while it is wet: and if suffer'd to run at random afterwards, the washing would not be of much Effect.

The whole Matter, which is very plain and easy, being thus understood, and all Things ready, let the Farmer proceed to the first Article, the washing of his Sheep. Let him see that this be done thoroughly and carefully. There is a way of slighting Business in such a Manner, that it might as well have been let alone; and this is too common in the Article of washing of Sheep, which is a Thing very troublesome to do well; and that easily hides Faults, for if the Farmer does not see that it be done well while they are about it, he will not be able easily to know afterwards, whether it be well done or no.

The Presence of a Master is always useful while Servants are employ'd for him; but in no Article more than this, for Cleanlyness will add considerably to the Price his Wool shall fetch.

When every Sheep has been thus carefully, thoroughly, and well wash'd, let them be all turn'd together into the Piece of Ground design'd for their Reception, and there be left to run till they are dry. This, according to the Weather, will take two, three or four Days, rarely more, for the Season is seldom very unfavourable at that Season of the Year.

All Things being now ready, let the Shearer get to work, and 'tis worth the Farmer's while to take a great deal of Care to have one who understands his Business: for an ignorant or careless Fellow at this Work, may do his Matter

more



more Damage in one Day, than a Month's extraordinary Wages.

In this let him over-see every thing with his own Eye, as in the washing; and if he perceive any Sheep half wash'd when it comes to the Hands of the Shearer, let him send it to be wash'd over again.

Let the Farmer order his Shearer to be careful not to hurt the Sheep, and let him have his own Eye over him, that he do not cut them, or prick them with the Point of his Shears, for the Flies will immediately take Advantage of these Wounds, and torment the poor naked Creatures to Madness. Finally, let him see the Wool be carefully taken off, and well wound up.

It is a very good Custom that some have, of shearing their Lambs together with the Sheep: although others very much condemn it. I would have the Farmer never fail to do this; but then he need not be very strict and exact about it all over. The principal Care is to shear them well behind.

Before they come to be shorn it is very necessary to cut away the Wool of their Tails, and just behind, that the Dung may not hang on it, which makes the Creature sore, and brings the Flies in the same Manner as a Wound with the Shears. When they come to be shorn they should be cut close behind; but very little before.

Sheep do much Damage to their Wool by lying in dirty Places, which they often will do, for they are not naturally a very cleanly Animal, as well as in their running in the Day Time. For this Reason the Wool of the same Breed of Sheep, is much finer in those Counties where they house them in the Night, than in other Places. In GLOUCESTERSHIRE, and some of the adjoining Counties, they house the Sheep always at Nights, and litter them with clean Straw. The Expence of this is very well paid by their Dung, which, together with their Urine mixing among the Litter, enrich'd also by their Sweat, and the Fatness of the Wool, makes a very fine, rich, and pretious Manure.

We have treated largely of the Use of housing Sheep, under the Article of their Dung, in its Place. The Method there prescribed of throwing in sandy or other Earths, to be enrich'd by the Dung and Urine of the Animal, is better than this of Straw, when the Article of Manure only is considered; but taking the Wool also into Consideration, this by Straw is greatly preferable.

'Tis from the Consideration of these several Methods, practis'd in different Places, and weighing the Advantages of each, that the judicious Husbandman encreases his Knowledge; and his Profits will always be enlarged in proportion.

From what has been said on these Heads separately, and in their proper Places, he will now, summing up the whole together, be able to determine upon a Conduct in the Management of his Sheep, which although built upon the Practice of different Counties, in separate Articles, is preferable, upon the whole, to any one of their Methods singly.

Thus if he use the cover'd Fold, for the Sake of raising a Quantity of Manure with Sand and other Ingredients, during the rest of the

Year, he will do well to throw in clean Straw, by way of Litter, for the four or five Weeks before their sheering. This will give him a considerable Advantage as Manure, if not equal to what he gets the other Way, and what he loses in that Respect, he will gain with Encrease by the Fineness of the Wool.

Upon this Principle also the Husbandman may very reasonably be directed to have a Kind of cover'd Fold, ever so slight, on the Ground where he turns in the Sheep, between the Time of washing and sheering. Let him strew this with clean Straw, by way of Litter; and see the Sheep all driven into it at Night. This they will very readily do, because they will feel cold after their washing; and by this Means, lying clean and dry, they will keep the Wool very nice for the sheering. Nay there is a Cleanliness in the Nature of Straw that will be a great Advantage, for they will rub themselves upon it to a clean bright Hue in the Wool, which it will not have any other Way.

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## CHAP. XIX.

### *Of the breeding up House Lambs.*

THE Price of House Lamb, at early Seasons, is so considerable, that it may be very well worth while for the Husbandman who is situated near large Towns, or where there is a Demand for it, to raise some for this Purpose.

To this End three Things are principally to be considered. First, to have a proper Kind of Sheep; secondly, to put the Rams and Ewes together at a right Season, that the Lambs may fall early; and lastly, to provide proper Pens in an House for the receiving and nursing up the Young: for their tender Bodies require a great deal of Care at such unnatural and severe Seasons.

There is a Kind of Sheep of the midland Breed, but a little smaller than what we commonly understand by that Name; otherwise very like those of the LEICESTER and NORTHAMPTONSHIRE Kinds; these are remarkable for their naturally lambing very early. If left to themselves they will bring forth about the Middle or latter End of DECEMBER; and therefore, if properly put together by the Husbandman, who understanding the Benefit of early Lamb, and computing the Time, contrives accordingly, they will come somewhat earlier. These Lambs brought forth in the dead of Winter, may be easily rear'd at Home, and will bring a Price that will very well answer the Trouble.

This particular Kind of Sheep is bred principally in HAMPSHIRE and WILTSHIRE; and is known among the common People by the Name of the Wey-hill Sheep.

The Husbandman who will proceed upon proper Principles, is always to prepare in Time for every thing. When he finds from his Situation and Circumstances, that he may have a Demand for House Lamb, at a good Price; and that he has Conveniences for raising it, let him take his Opportunity to buy some of these Wey-hill Sheep at the best Market, and be particularly careful that they are, in every Respect, sound and free from



from Blemish; chusing them severally, the Rams and Ewes, according to the general Direction laid down here for that Purpose, which answers for one Kind of Sheep as well as another.

Being provided with a proper Number of these Sheep, let him not leave their Time of breeding to Chance, but keeping them separate, till a proper Season, then put them together, that they may copulate in such Time as to bring forth their Lambs at the Season he desires.

After this no farther Care is necessary than that the Ewes are fed in a Pasture not too rich, for the greatest Part of their Time; but about three Weeks before their lambing, they are to be brought into a richer Feeding; and as the Time of their bringing forth is very exactly known, let there be due Care taken of them, and of the Lambs as they fall, that neither are hurt by the Severity of the Season.

The Sheep being thus carried on to their Time, and the Lambs brought forth, the last Care is the bringing them up for the Service of the Table; or, according to the Farmer's Reckoning, for the Purchase of the Butcher.

A great many Arts are used to this Purpose; and a great Number of different Directions have been given about it, by those who have pretended to have great Knowledge; but the whole may be delivered in a few Words, and the Husbandman who shall set about this, upon the Principles of good Sense alone, will find that most of those Cautions and curious Directions that have been so elaborately delivered, might have been spared.

The whole Care consists in two Articles, the keeping the Lambs warm, and the feeding the Sheep in such a Manner, that they may be able to supply them with a rich Milk, that will fatten them. There can be no great Difficulty, and certainly no Mystery in this, so that it is idle to pretend to Secrets about it; and more idle in any to deter the Husbandman from it, under Pretence of his not understanding how to do it. Let him set about it with these Precautions, and look to the Lambs himself with due Care, to see they are warm and clean; and feeding their Dams as he ought to do, he cannot fail.

The Severity of the Season would destroy the Lambs, if they were left to ramble about with the Ewes; and the Scarcity of Food, at this Time of the Year, would make them unable to fatten them by their Milk, if they were not provided accordingly; but good Food will make rich Milk, and a due Portion of Food will yield it in due Quantity. This is all that is needful, and all this may be brought about in this easy Manner.

Sometime before the Ewes are expected to bring forth, let proper Pens be built up for them, in an House that is warm, but not shut up close, for if they have not Air they will not thrive with any Food.

As soon as they are brought forth let them be carefully put into these Pens, and from that Time watch'd and tended, that they may be always warm, dry, and clean.

We have already directed that the Ewes, toward the Time of their bringing forth, should be put into a richer Pasture than that they had run in before: this will provide them a Stock of

N<sup>o</sup> 19.

good Milk, and now they have lamb'd, this is to be enlarged and enriched, by giving still better Food.

The best Food for this Purpose is Turneps; but where they are not in Readiness, the Ewe, beside her rich Pasture, must have, at Times, Hay, Bran, and Oats given her.

It is fit the Husbandman should know what to do, in Case of a Deficiency of what is proper, but these other Supplies do not enrich the Milk in the Manner of Turneps; therefore he who proceeds upon our prudential and careful Principles, must not fail to have Turneps for the Occasion.

The Ewes are to be brought into the House three or four Times every Day, to suckle the Lambs; and in this Manner, as those young Creatures are kept very cleanly and comfortably, and feed to their Fill upon rich Milk, and upon nothing else; they will fatten quickly, and their Flesh will naturally be exceedingly white and delicate.

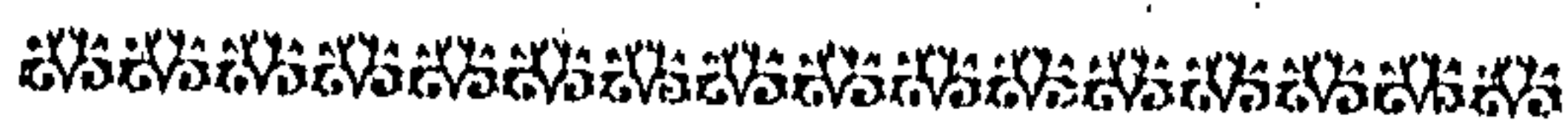
The whole Art of this profitable Part of the Husbandman's Business, is comprised in these few Articles. The Ewes being well fed, have plenty of rich Milk, and the Lambs sucking to their Fill, and being kept quiet, fatten upon it freely. As to the Difference of Season they feel nothing of it; for so they be kept warm, it matters not to them whether it come from the Sun, or from their comfortable Shelter.

Having mentioned, in its Place, the folding of Sheep for the Benefit of Land, arising from their Dung, we shall here add one Caution on that Head, respecting the Creature itself, and then close this Article.

The Advantage the Land receives from the folding of Sheep is very obvious; but let the Husbandman take Care that he does not lose more by the Damage he does his Sheep by this Practice, than he gets by the enriching so much of his Land.

There is nothing that tends more to give Sheep the Rot, than this Method of folding them, when due Care is not taken in the doing it.

The Sheep are to be put into these Folds at Night, in Summer, but let the Husbandman take Care only to do it in good Weather; otherwise it may cost him very dear. Let him see that they are not turned out in the Morning, till the Sun has been some time up; and let him take Care they are driven to a good feeding Place, for otherwise, being hungry, they eat any thing: and thus, between cold Nights and bad Food, they get the Rot and perish.



## C H A P. XX.

### *Of Hogs, their Advantages and Evils.*

A GREAT Recommendation of any Animal to the Farmer, is the Cheapness of its Food, and this sets the Hog above almost any other in his Esteem; little is to be bought for that Creature, and he consumes very little of the Stock of whatever Kind, any thing contenting him that is eatable, though his Appetite is greater than that of any of the Kinds yet mentioned.

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If Food is to be raised for the Hog, it comes very easy; Coleworts, French Beans, and any other of the coarser Vegetables answer the Purpose, they grow any where, and are sown with little Trouble; and the worst of these will fatten the Hog; in which Condition he supplies the Family and the Market, to a very good Account.

The Flesh serves the Farmer in a Variety of Forms, and when the more marketable Parts are disposed of, there remains a great deal that answers that Purpose.

The Refuse of every Thing serves them for Food, as whatever is thrown from the Barn, the Kitchen, or the Dairy. If they be suffer'd to run free about, they will, in a great Measure provide for themselves, but this is not a profitable Method, although it may appear a saving one. My Husbandman doubtless is acquainted with that good old Observation, that all that is saved is not got, and it will serve for his Instruction here; for while they get their Food for nothing by running abroad, they waste their Flesh; so that what is lost in their Value, is much more than is gain'd by the saving.

Having named the good Qualities of the Hog, it is proper to mention also the bad: the Farmer who is about to buy in his Stock, should know at once the Advantages and Disadvantages attending every Kind, that he may purchase accordingly. The Hog is the most ravenous of all the Creatures commonly kept about Houses. They spoil and destroy more than they eat, if they are not kept in due Bounds, and with a proper Care; and their rooting up the Ground is a very troublesome and mischievous Quality. No Creature is more apt to break the Farmers Fences than the Hog; and between this and his tearing up the Ground, and trampling Things to Pieces, the Mischief he would do if left at large would be endless, and all his Value would not pay for it.

These are his ill Qualities, they are therefore to be guarded against; and in Proportion as the Farmer is in Danger of being more hurt by them, and has it less in his Power to prevent them by a proper Manner of keeping the Creature, by so much the more cautious ought he to be in the buying any large Number of this Animal.

The Ways to prevent these Accidents, are by managing, or keeping the Hog up. We have said before that in running at large the Hog wastes his Flesh, therefore it is always best to keep them penn'd up into some Court. This is the most beneficial not only with Respect to their Flesh, and its Profits, but to the Dung they make in these Places, for whatever is thrown to them, that they do not eat, they here trample to Pieces, and being mix'd with their Dung and Urine, it becomes excellent as Manure.

In Places where it is not convenient to keep them thus enclos'd, their rooting up the Ground is prevented by putting Rings into their Noses; and their breaking Fences in some Degree by their being yolk'd.

These are the Remedies for the Evils attending the keeping of Hogs; and the Husbandman

who has already seen their good and ill Qualities, will judge upon this according to the Circumstances of his Farm, whether it be convenient for him to engage in the feeding many of them or not.

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## C H A P. XXI.

### *Of the several Breeds or Kinds of Hogs.*

**I**F upon mature Consideration any one determines to keep Swine in large Numbers, and with Expectation of a considerable Profit, let him first be very careful in chusing his Kind. There are not so many distinct Breeds in Swine, as there are in Sheep and Oxen, but there is a great deal of Difference between those there are.

The Breeds may be distinguish'd into three, 1. The wild Hog, which is small, but hardy: it will feed upon less than any other, and its Meat, though smaller in Quantity, is preferable to that of any other. 2. The common Hog which is larger, longer leg'd, and bigger bon'd than the wild, and affords an excellent Bacon: and, 3. The low big belly'd Hog, which is of late become very common in most Parts of ENGLAND. This lives cheap, is less mischievous than the others, and breeds very fast. But it is inferior to the common Swine in its Advantages to the Farmer, all Things being consider'd together.

Of these several Kinds the low Hog is to be chosen by those who live in and about large Towns, to run about the Streets, where it takes Care of itself, and does better, being of a quieter Disposition than the others: the Farmer in the Country is to chuse the common Hog as best suited to his Purpose, being the largest in its Growth, bringing forth a sufficient Number at a Litter, and being easily fatted for the Service of his Family, or for the Market.

In some particular Counties these Creatures thrive better than in others, particularly in HAMPSHIRE, LEICESTERSHIRE and WARWICKSHIRE. It will be therefore prudent, if it can be done with Convenience, to buy the Hogs for breed from these Places; and let the Purchaser be very particular on this Occasion in respect of their Shape.

Let them be chosen with long and large Bodies, deep Sides and Bellies, and very thick Thighs; let the Neck be thick, the Nose short, and the Chine thick and well set with large and strong Bristles.

When the Farmer has taken Care about a proper Kind of Hog for stocking his Yard, and understands thus how to chuse them, let him next be careful in suiting the Number to the Bigness of his Yard, and to the Quantity of the Provision he will be able to supply them. And in this the Care is, that he do not take in too many; for no Creature breeds faster than the Hog, and if he does not use Moderation in setting out, he will be over-run with them.

This great Increase depends partly upon the Number the Sow brings forth at a Litter, and partly from the Shortness of the Time she goes with young. One of these Creatures will have four



four Litters in a Year, and they will bring from eight to twenty at a Time. So large a Number as the last is not common, nor indeed is it natural, for the Creature can bring up no more than she has Teats to suckle.

When a Sow brings forth more than she can raise, they must be put to other Sows, if there be any in the Yard in a proper Condition to suckle them; if not, they must be destroy'd, for there is no raising them.

The more Hogs there are in the Yard, the more ravenous they are, for they grow greedy by observing the eating of one another; and if there be not sufficient Food for them at the Time when they give suck especially, they will eat up one anothers young, or their own; so that of all Creatures in the Stock, the greatest Care is to be taken with regard to these, that more are not taken in than can be fed.

Let the Farmer chuse out the largest and stoutest of his Pigs for the continuing of the Breed; and one Rule of judging early of their Qualities in this Respect, is the observing which they are that suck the foremost Teats; for they all aim at this, and the strongest get them.

After the proper Number of the best and strongest Pigs are thus chosen out to be rear'd as Boars and Sows for Breeding, such as are not disposed of while Pigs for the Spit, are to be gelt or spay'd according to their Sex. This prodigiously increases their Fat, especially that of the Females.

Great Quantities of Hogs are rais'd at this Time by the Brewers and Malt Distillers, because of the Convenience of their Grains; but of this more need not be said here, the Method being known and easy, and at this Time deliver'd down among the Rudiments of those Professions to such as learn them. They are kept clean and well fed, and nothing more is requir'd to their perfect thriving.

There are two different Ways of managing the Flesh of the Hog for Service; the one for Pork, and the other for Bacon. According to the Choice of these, the Age of the Creature is to be different. About nine Months old is the proper Age of the Hog for killing for Pork, and the finest Time for Bacon is when they are a Year and half.

As to the Time of their Breeding, the stoutest and best Pigs are to be had from Sows of three, four, or five Years old, but they will begin to breed at a Year old, and will very well continue till they are seven: the three Years I have nam'd are however the prime. The Age of the Boar is to be consider'd by those who would keep up a good Breed, as well as that of the Sow, he should not be less than two Years old, nor more than five.

The Boar is no Loss at the End of this Time, he may be sold for Brawn, if an Opportunity offers; if not, he may be gelt, and will fatten very well: nor does the Operation, though perform'd so late, do him any Harm.

A great deal of Prudence is requir'd in the Management of this Creature. An Error any Way in respect to their Food, is very prejudicial; for the general Course of their Lives it matters not much what it is, but due Care must

be had about the Quantity. If they are allowed too little, they will be continually ravenous and mischievous, and if they are fed too plentifully, they will not be healthful. They should be kept in Heart and Strength by moderate feeding, till the Time they are to be fatten'd up for killing; and on this Article depends in every Respect, a great Part of the Profit that shall arise from them to the Owner.

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## CHAP. XXII.

### *Of the feeding of Hogs.*

AS to the Manner of feeding Hogs, the best Method is to keep them for the most part in the Yard: their Food there should be Wash every Morning and Evening; such as Dish-water with Grounds of Drink, and a few Grains or other Offal: for the rest of the Day they may be occasionally suffer'd to graze, especially in damp sedgy Grounds, and the Refuse of the Garden is to be thrown to them in the Yard. Such of this as they do not eat, they will tread to Pieces, and with their Dung and Urine it will become excellent Manure.

Hogs feed excellently in Woods, and under Hedges in Autumn, when the wild Fruits are ripe and falling, they eat every Kind; Hips, Haws, Sloes, Acorns and Beechmast, and these are a very natural and excellent Food for them. If Hogs could be fed thus constantly, their Flesh would be sweeter and better tasted than it is in the common Way of fattening of them; but in some Places there is but little of this Food; then it falls out only at one Season of the Year, and the Creature is not well to be trusted. When all Things concur, the Flesh of a Hog thus fed is excellent: some think this Food alone will not give the requir'd Firmness to the Fat, but Experience shews they are mistaken.

When Hogs are to be fatted in the Sty, Cleanliness is a very great Article. They must also be fed often, and not too much set before them at a Time, for their ravenous Appetites will lead them to eat more than they can digest. Their Food must be fresh and good; they must have as much fresh and sweet Water as they chuse to drink; and be kept quiet. In this Manner they will fatten soon and well. Their Fat will be firm, and their Flesh well tasted.

Nothing answers so well in all Respects for the fattening of Hogs as the Fruit of the wild Trees; they have Air and Exercise while they get it; and they live clean; and it is their natural Food: these are great Reasons, but where there is not a Convenience of getting this Food, or the Season of the Year does not suit, the Way is to fatten them up altogether in Styes, and this is to be done with Pease; or when they happen to be dear, the Meal of offal Corn will answer the Purpose: these are to be mix'd up with Whey or skim Milk, or Milk and Water, and the Creature will never fail to fatten upon any of them.

It will take about a Month to fatten a Hog in this Way, supposing him to have been in that midling



midling Condition before, which we have recommended for the Sake of his Health. Pease, when they are to be had, are to be prefer'd to the other Foods; and there is such an Opinion of their Effect in giving Firmness, and a clean Taste to the Fat of the Bacon; that in Places, or at Times when they happen to be dear, although the Hog be fattened up with the other Things, they generally give him a good Quantity of Pease the last Week.

Hogs will ravenously eat the Buds of many Trees, particularly the Ash and Sycamore, and it is a Practice in some Places to beat down Sycamore Leaves for their Food, upon which they will fatten.

Grains fatten them very quickly, and often when these Creatures will not thrive with any other Food, these will bring them to themselves, and they will afterwards fatten upon any Thing.

The Way in which Hogs are fattened in many Places, for the Service of the Navy, is excellent; and when there are Conveniencies for it, should be follow'd by every Farmer who deals in these Creatures. They take in a Piece of Ground by the Side of a running Water, hedging in also some Part of the Water that there may be a Place for the Hogs to drink without Danger of their Escape. They stack up a Quantity of Beans and Pease in this inclosed Piece of Ground, and turn in as many Hogs as the Quantity of Food will fatten. They let them here live at their Ease and Liberty one among another, cutting down the Stacks as they are wanted. Thus having Plenty of Food and Water, and Room and Quiet, they fatten excellently.

As the Hog is a Creature often apt to waste its Food if too much be given at a Time, they have a very good Contrivance in some Parts of OXFORDSHIRE to prevent this, and at the same Time to save the Trouble of that constant Attendance, which is requir'd in feeding them with small Quantities at a Time. They do it in this Manner. They place over the Styer a Vessel like the Hopper of a Mill, and into this put as much Beans or Pease, or other dry Food, as will fatten such a Number of Hogs. From this there comes a large square Pipe down half Way of the Styer, thro' which the Food continually descends out of the Hopper. This Pipe terminates at that Distance in six smaller Pipes, each of which ends in a small Trough, that is no bigger than just to admit the Nose of the Hog; and they come all of them with their Ends so near the Bottom, that there is never above a Handful of the Food at a Time in each Trough. When this is taken away by the eating of the Hog, there follows so much more. This prevents their wasting any Part of the Meat, at the same Time that they have a constant Supply: and if it happen from the Convenience of the Place, that a small Current of Water can be brought through the Styer, they will in this Manner be fattened with less Trouble, than in the Way already mention'd of stacking the Beans and Pease for their Service.

The Inconvenience from Hogs rooting up the Ground, has been mention'd already; and the common Method of preventing it, which is by

putting a Ring in their Nose; but as this is often ineffectual, and a great deal of Mischief is sometimes done very unexpectedly by these Creatures, we shall propose, to the Imitation of the Farmer in general, a Method much more secure, which has been long practised in STAFFORDSHIRE; and some of the neighbouring Counties, although it has not got into Use in all Parts of the Kingdom.

Instead of the Ring they use a forked Iron, arm'd at each Point with a Fin like the half of an Arrow Head. This being thrust through the Edge of the Hog's Nose, cannot be got back, and they cap the Bottom or square Part of the Fork that lies upon the Nose with a long and hollow Ring, which turns round upon it. So that the Creature can never take hold enough to turn up the Earth. This is a Contrivance very easy, and it shews its own Use. The Damage Hogs often do by rooting up the Ground is sufficiently known; and many have found how unfit the common Method by Rings is to prevent it. This will never fail perfectly to answer its Intent; and ought therefore to be universal.

The Method of feeding Hogs on Clover has been mention'd occasionally in another Place, when we were speaking of the Dung of that Animal as a Manure; and something farther may be properly added here. Clover is an excellent Food for the Hog, but it is best not to make it the only Food, for it is apt to give a Yellowness to the Flesh, which hurts it in the Market. The best Method of giving Hogs Clover is, at the same Time that they are feeding at other Hours of the Day on other Things. Thus let them be turn'd out of the Styer without their Breakfast of Wash in the Morning, that they may have a good Stomach for the Clover; and at the right Season be driven into the Field with the Horn'd Cattle. At Evening let them be brought home, and fed with Wash mix'd with Grains or Corn, or let them have instead of the Wash, a great deal of skim Milk or Whey. This is the Manner in which Hogs may be fed to the greatest Advantage upon Clover: and it is a very good Method of managing them.

Bran and Pollard fatten Hogs very speedily, but the Flesh is not so firm: nothing for this Purpose answers like the Pea or Bean; a great Variety of Foods might be mention'd for a Creature that will eat any Thing, but there are none of them come up to these, which are natural to the Animal.

The Distillers Wash and Grains feed them up quickly, but there is a great Difference between the Bacon and Pork fattened by that Means, and such as is fed on the natural Fruits of Trees or Pulse, such as have been before recommended.

The same Kind of Food is also excellent, given properly, and in due Quantity for the feeding of Pigs at their first weaning, the best Food is skim Milk, Whey, and the artificial Grasses. After a Week or ten Days, it will be proper to add Bran or Grains to the Whey or Milk; and soon after this they may have Pease and Beans in Moderation, and this will increase their Growth, and make their Flesh better. After this, if they have been pig'd in an early Season, they



they will come in for a Share of the Stubbling and Beechmast which will at once raise them beyond Expectation.

A great deal of Advantage in this Respect is owing to the Season of their being pig'd; the Spring, or early in Summer, is the best Time for those that are intended to be brought up; those that are farrow'd near Winter, if ever so much Care is taken of them, growing slowly they are often stunted in their Growth; and they are always more subject to Diseases than those which come at a more favourable Time.

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## CHAP. XXIII.

### Of Goats.

**T**HE Goat is not to be set upon an Equality with the Sheep or Swine, in its Value in any Respect; but there is an Advantage attending it which none of the others have, and which ought to recommend it to the Consideration of all who are situated so as to enjoy its Benefit; this is, that it will live where neither Ox, Sheep, or even Hog can. In such Places it does not stand in Competition with those several Kinds, for they cannot be fed there; but for this very Reason, the Goat should be bred in those Places, for the Profit of this Creature is something; and it is in that Case the only Kind that can be had.

The Goat will feed in common Pastures, but there it is not worth while to breed or suffer them, for Sheep of one Kind or other will live on them according to their Natures; and the very worst Kind of those are greatly preferable to the Goat in Profit. Beside, the Goat is more apt to crop the young Shoots of Trees and Shrubs than any other Animal whatsoever, and in this Respect alone, would do more Mischief than he was worth.

These are sufficient Reasons against breeding this Creature in common Grounds, but where there is hilly, barren and useless Land in any Quantity, there 'tis every one's Interest to breed this Creature, for it will walk at its Ease where any other Animal would break its Neck, and will feed very well where any other Kind would starve.

The natural Soil and Situation for the Goat is a barren, rocky, and craggy Mountain. These Places, even the worst of them, produce some Briars, and other small Shrubs, and upon the Shoots of these the Goats browse with the greatest Satisfaction imaginable.

In general the Food of Goats is such, as is of no Use to any other Creature; and they are to be bred with very little Care or Trouble. For these Reasons I would advise every Husbandman who has in his Possession this barren, bushy, and rocky high Ground, to keep them: and for his Instruction to make the greatest Profit by them, I shall lay down some Observations which I have received from a very worthy Correspondent upon the Borders of WALES, where there are a great Quantity of them kept to considerable Profit.

There is less Difference in Goats than among Numb. XX.

most other Kinds, yet for the Farmer who intends to bring them to a new Place, the following Considerations should be observed in the Choice.

The best Goats are those which are strongest limb'd, and largest bodied, therefore let them be chosen for Breed, big made in every Part, and cover'd with a deep and stiff Hair. Let their Joints be firm and strait, the Neck short and thick, and the Head small and slender, with full and large Eyes, and long and stout Horns. The Colour is not material, nor certain, but in general the black Goat is the stoutest, and his long Beard is a Sign of a good Kind; the py'd Goats are supposed to bring forth the finest and best tasted Kids, but this is not certain or unalterable.

The Goats being thus chosen, the next Care is the putting them together for Breed. No Creature is so ready for copulating. The Season when the young will be best bred up, is such as comes from their being put together toward the Middle of Winter. This is the Time at which the Husbandman who intends to raise a good Breed, should put them to one another; and to this Purpose the he Goat should be from two to five Years old: he is best if about three or four; and the she four, five or six. This is the Time of Life at which they are found to breed the best and stoutest young ones, for the he Goat wears himself out by his frequent Copulation, and is enfeebled by Age at six Years old; after which Time his Young are poor, and seldom come to any Thing.

The she Goat is seldom troubled with Distempers, and is a very free Breeder; they will very well bring forth twice a Year, and they have sometimes two, and sometimes three Kids at once.

The Goats should be kept in Herds or small Flocks; and though they are very hardy, yet it will be a great Advantage to them if they have Shade in Summer, and Shelter in Winter. But this last must not be carried too far; if they be housed in the hardest Time of the Winter, as is done in some Places, they should have no Litter; for that will make them too hot: they are used to Hardships in their natural Way of living, and nothing is so likely to do them Mischief as too much Care and Tenderness. Cleanliness is a great Article when they are housed, for as they are used to sweet Air, and are in themselves very rank; if they are kept hot and frowzy, they fall into Disorders.

Nothing will require a stricter Care in the Farmer's Hands who breeds Goats, than the defending his Trees from them, for they will certainly destroy the young and new planted ones; and the oldest will not escape.

It is enough for the Defence of Trees against other Animals, to train them up so that the Branches shall be above their Reach from the Ground, but this is no Defence against the Goat; for that Creature will climb the old Trees, particularly the Elm, of whose young Shoots it is very fond, and will browse for Days together among the young Branches.

For this Reason as the barren and rocky Grounds before mention'd, are fit Places for them, they should be confined to these alone.

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Otherwise they will soon do more Mischief than they are worth. This keeping them in due Bounds however, is not difficult; and there are a great many Places in ENGLAND, where a very considerable Profit might be made by breeding them.

The Advantages the Husbandman receives from the Goat are of four Kinds. The Milk, the Flesh of the Kid, the Skin, and the Hair: but of these the two latter are less regarded.

The Hair is, in some Places, us'd for twisting into Ropes, and has this Preference above all other Kinds, that it will never rot in Water. In some Places also Goat's Hair is wrought into a Kind of Cloth for Apparel.

The Skin is capable of being dress'd into a very good Kind of Leather; and it is used for this Purpose in some Places, though altogether neglected in others. Goats Milk is of the Nature of Asses Milk, an excellent Restorative in Consumptions, and for decayed Constitutions; and in some Counties they make a very good Kind of Cheese from it: in other Places, where the Stock consists partly of Goats, and partly of Cows, the latter of which the Husbandman cannot keep either of a very good Kind, or in any great Number, because of the Barrenness of his Land, they mix the Goats Milk and Cows Milk together, and this Way it yields a very good Kind of Cheese, and that in a large Quantity, according to the common Way of making. This is the Practice I should advise to the Farmer who keeps Goats: for there is scarce any Place where he may not upon the better Pieces of his Ground, keep some Cows, and the Goat's Milk answers much better, and is managed much more easily for Cheese in this Mixture, than when People are reduced to use it alone.

The Flesh of the Goat is very rank, and even unwholesome, as well as unpleasant; but Kid is a fine Meat, it is very little inferior to Venison; and as the Kid is so easily had, and rear'd with so little Trouble, were there no other Reason for keeping of Goats, this were sufficient. People that are delicate about the Flesh, are at the Pains to rear Kids for the Table, in the same Manner as we have directed already for Lambs; but this is not worth while, for with the least Care imaginable they grow to an excellent Condition, as they run wild after the Dam.



#### C H A P. XXIV.

##### *Of the Rabbit in general.*

**T**HE Rabbit is a small Animal, and may appear of small Consequence after the Kinds already named for the Farmer's Breeding, yet this is very well worth his regarding, as a Part of his Stock. It has the Recommendation of the Goat, that it will thrive where nothing else can live; and the same Advantage as the Hog, in the great Increase by young.

Both the Buck and Doe Rabbit are eager for Copulation, and they must not be restrain'd. The Does go but a Month with young; and as soon as they have brought forth, they are

ready to copulate again. When they run wild they get together in a very little Time; and when they are kept tame and separate, they must be put together soon after the bringing forth, otherwise the Doe grows fullen, and will take little or no Care of her young ones.

The Rabbit is distinguished into two Kinds, the wild and the tame. These are kept in a distinct Manner; the wild running loose, and burrowing themselves Holes in the Ground, and the tame being kept in Houses, Huts, or Boxes.

Both Kinds yield a very large Profit, though under different Management. The wild Rabbit breeds fastly and freely in Warrens, or other Places where there is Room and a free Air. They will thrive upon the poorest and barrenest, gravelly, stony, or sandy Soils; by stony we mean such as are full of small Stones, not the rocky, for in these last they cannot burrow. In these Sort of Grounds the Farmer will find great Advantage from the breeding of Rabbits, either altogether or occasionally: for in the latter Way they improve these barren Lands extremely, by their Dung and Urine, and render the work of them fit for raising good Crops of Rye; and such as are but a little better, for the other Kinds of Corn.

The Distinction between wild and tame Rabbits is not founded in Nature, but on our own Practice; for the wild Kinds may be as well kept tame as the others. They are used to a Kind of Imprisonment in their Holes, and for that Reason they bear Confinement better than most other Creatures.



#### C H A P. XXV.

##### *Of the Wild Rabbit.*

**A**S to the wild Kind there is properly but one Breed of them, and all the Direction that is needful in the Choice is, that such as are taken to begin a Stock, be large and big bodied, with a good deep Fur that hangs fast upon their Backs, and with stout Limbs. The Husbandman that has waste Ground in his Hands, that is fenced well, and not with live Hedges, should never omit this Part of his Stock, for the very worst of his Ground will do, and the Advantage he receives from them will be very great.

A small Number is sufficient to be first turn'd in, for of all Creatures useful to Mankind, they are the greatest Breeders.

Experience shews that the wild Rabbit succeeds better in some Places than others; the young growing up much quicker, and the Flesh being finer and better tasted. The Reason of this is to be search'd in the Soil and the Produce; and this may teach the Husbandman on which of such Grounds as seem proper, it will be most to his Benefit to breed them.

In general, the shorter and scantyer the Grass, the better is the Taste of the Rabbit. The dryer the Ground the better they succeed, where there is much Water they never are well flavour'd.

Of all Creatures, Water is the least necessary to the Rabbit, for we see the tame ones will live very well altogether without it, on moist Food.

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Where the Soil is dryest, the Air finest, and the Water that there is in the Way is running and clear, there the Rabbits may reasonably be expected to succeed best. Damp Ground, and standing Waters being the greatest Disadvantages to this Creature.

As I have observed that the common wild Rabbit will very freely be kept tame; so it has been found, many Years since, that those which we usually understand as tame Rabbits, will live very well wild, especially the hardier Kinds. This is a Consideration of some Consequence, because there is one of the tame Kinds that is, in every Respect, better than the common wild one. This is that which is known by the Name of the Silver-hair'd Rabbit. It will live and thrive as well wild as the common Sort; and it is always better tasted and fairer to the Eye, so that it brings a larger Price. The Skin also is of much more Value, and the Demand for it among the Furriers is constant and certain.

For these Reasons it is, in many Cases, advisable to breed this Kind wild instead of the other: but though it often is so, it is not always. This, though as hardy as the other, requires a better Supply of Food, and is poor, and of little Value upon those barren and heathy Lands, on which the common wild Rabbit succeeds very well.

The proper Place for this Kind is a Park, where it may run at Liberty among the Deer and other Cattle, and where there is good Grass, though not rank, upon the Ground: the other is the proper Kind for the miserablest and poorest Lands.

## C H A P. XXVI.

### *Of the tame Rabbit.*

**T**AME Rabbits are distinguished into several Kinds, according to their Colours and other accidental Distinctions; but the Differences are not great, nor is there any material Point of Profit attending the Choice of one or the other Sort.

The Silver-hair'd Rabbit last-named, is a very good and profitable Kind to be kept tame, because of the Advantage of the Skin. The Dutch Rabbit is a much larger Kind, and is very good for the Table, but the Skin is of less Value. The most beautiful, when kept cleanly, is the white long-hair'd Rabbit, this is, by some, called the Turkey Rabbit, from the Place from whence we first had it; and by others the Shagge Rabbit, from the Length of its Hair. This is a very good Kind to breed tame also, but if not kept very clean, it is subject to a Disorder not unlike what Doctors call the Plica Polonica; the Hair growing together in Clots and Cakes, and this often in such a Manner, that Blood Vessels from the Skin run up amongst the Clots, and they will bleed on being cut off.

It is not very material which of these, or of the several other Kinds that it is a Custom to breed at this Time, the Farmer chuses; for, with proper Management, any of them will turn to very good Account; but which ever Sort it be, let him take

a more strict and critical Care in the Choice, than he has been directed to do in those which are to run wild, for a great deal more depends upon it in this Kind, than in those. The Skin here is of much Consequence, and the Distinctions in this are nice, and never enough to be regarded in the Choice for Breed.

In the Silver-hair'd Rabbit for Instance, let the Husbandman take Care to chuse his Buck of the true Kind and Colour, for on this, more than on the Doe, will depend the Value of the Breed. Let the Fur be thick, deep, smooth, and glossy; and let the Ground Colour be black, with a moderate Quantity of white or silvery Hair. It is proper to chuse them rather too dark, for breeding, because the Colour in the young is more apt to grow paler than deeper; and a Silver Skin that is too dark, always will bring a better Price than one that is too light.

In the same Manner let the Fur of the several other Kinds be examined, when they are chosen for breeding; for the rest of the Directions already given, for the Choice of the wild, hold good here: the largest and best shaped being to be fix'd upon. In the same Manner as these Rabbits were first chosen, let them be pick'd out from time to time for keeping to preserve the Breed; for upon this will depend a great Part of the Advantage.

The Farmer having thus selected his Stock of these little Animals, is to take his Choice of the several Methods which are in Use for the breeding and keeping of them. These are many, and among them some allow more and some less Liberty to the Animal: in general, such as allow most Freedom, even in this Way, and most Air, are best, for though the Rabbit will bear Confinement very well, yet it will thrive best where that is least strict.

Cleanliness also is a very great Article in the breeding of these, as well as other Creatures, and where the Confinement is least strict, there is naturally least Foulness. The Dung and Urine of the Rabbit have a very disagreeable and rank Smell; and nothing prejudices the Creature more than being kept nasty with these about it.

The general Way of keeping tame Rabbits is in a Kind of Boxes made for this Purpose: others keep them in Pits; but it would be a much better Way to keep them in Buildings made for that Purpose. This might be done at a small Expence, and would answer very well: for it would be cleaner and more wholesome than any other Way. The Boxes are too small, and therefore are apt to grow nasty, and the Pits are liable to be damp, which, as we have observed already, is one of the worst Things that can happen in a Place where Rabbits are to breed.

The Boxes, for such as prefer them, should be made of thin Wainscot, and divided into larger and smaller Rooms, two for each Rabbit. One of these should be for eating, and the other for lodging and bringing forth the young. That for eating should be the larger, and should have a Grate before it for Light, and the smaller should be entirely dark. Before both there must be plac'd a Trough, with the Food; and thus the Creature will live, thrive, breed, and fatten: but there wants free Air, and it is very difficult to keep



keep them cleanly, so that although this Method may do, the others are sure to answer better, when they are managed properly.

Those who use this Method by Boxes, set them one above another, in so many Stories; and keep the Bucks by themselves, and the Does by themselves; unless it be such Does as have not bred; and with those they lodge a Buck in the same Box. The common Size of these Boxes is two Foot long, the same in Breadth, and a Foot high. It is surprizing to see so large a Creature as a Rabbit live so well as it does in this small Compass; but it will always do better when it has more Room.

The Method of keeping them in Pits is preferable, and is thus. A dry Soil is to be fix'd upon for this Purpose, and the Pit is to be dug seven Foot deep, and of a Bigness proportioned to the Number intended to be kept in it. This must be wall'd up on the Inside, only leaving Spaces for them to make their Burrows. A sandy Soil, not too destitute of other Earth, will answer for the Purpose of these Pits, better than any other. At one End an hollow Place is to be made for the Buck to rest in, he must be chain'd to a Stump, and have Room only to go to the Rack where the Food is placed in these Pits, and thence to his Den to rest. At the other Parts of the Pit, out of the Reach of the Buck, are to be the Places left for the Does to make their Stops or Burrows. The Rack is to be placed near the Middle of the Pit, between the Buck and Does, he being on one Side by himself, and they on the other.

Three Does may very well be kept in the same Pit with one Buck, and the Pit for this Purpose should be about ten Foot square. Some make them larger, and keep more Bucks than one, but it is a better Practice to make more of them, only allowing one Buck and two or three Does to each.

This will naturally appear to those who are not acquainted with these Things, a large Provision for three or four Rabbits, and a great Expence for so few and small Animals; but those who have kept these Creatures know that it very well answers the Expence. Provided the Pit be dry they live more comfortably by much in it, than in the other Way of Boxes; and the Produce is so great that one Buck and three Does will bring a hundred and fifty, two hundred or more young ones in a Year.

The young are to be left under the Care of the Dam, till they are about a Month old, and they are then to be taken from her, either for Sale or the Table; or if there be no Demand either of these Ways for them, they must be put into some Pit, or other Place made for that Purpose.

The same Practice is to be observed in removing the young, if they are kept in Boxes, or whatever other Way. In whatever Manner the old ones are kept, when they have brought forth a second Brood, the first is to be taken away, and rear'd up else-where. The common Way in this Case is, to remove them to other Boxes, keeping those of several Broods of about the same Age together: and thus they are to be treated in the other Way, either rearing them in

another Pit, or in any Manner that is convenient, only allowing them some Room and Air, the more of both the better.

The Reason of chaining up the Buck Rabbit in the Pit, and of keeping him in a separate Box in the other Way, is his mischievous Disposition, for he will kill all the young ones. This the Does are themselves so sensible of, that they, in their natural wild Life, hide the young ones, and close up their Holes, that the Buck may not find them.

The two great Requisites in these Pits are Warmth and Dryness: their Depth, unless the Ground be very favourable, making them subject both to damp and cold, in either of which Cases the Rabbits will not breed well.

The most profitable Time of their Breeding is in the Depth of Winter; and they will never breed at this Season, at least not successfully, unless they be kept dry and warm.

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## C H A P. XXVII.

### *A profitable Method of keeping tame Rabbits.*

IT is from the Danger of the Cold and Damp in Pits, and because of the want of Air in Boxes, that I have been led to think of such other Methods as may give Rabbits the Advantage of both in a fit Degree, and yet keep them in such an easy and ready Way, that they might be always at hand, easily fed, tended, and looked after in every Respect, and yet have Warmth and Freedom.

To obtain these several Advantages, by means of which tame Rabbits of the best Kinds would be kept in the greatest Perfection of Health and Beauty, and to the greatest Advantage of Breeding, let the Husbandman erect a Building purposely for them.

Having chosen his Rabbits for Breed, let them fix upon a proper Spot of Ground for his Edifice, and draw the Plan of it of such Extent as to contain conveniently the Number he shall think proper to keep.

Let the Soil on which he builds this Place, be of a dry loamy Kind, with a large Proportion of Sand in it; for this is the Sort of Earth the Rabbit loves best, and in which it is always most healthy.

Let the Building be square, and run up of Wood in a slight but yet a tight Manner; and let there be a Kind of Closet carry'd up at one End.

In each Corner of this Square let there be a Den made for a Buck Rabbit, and a small Post driven in, to which to fasten him by a Chain, in the same Manner as in the Pit. At some small Distance from the Corners, let there be Racks set up for Food, which shall be within the Reach of the Bucks, and one or two others in the Middle.

When the House is thus prepar'd, let the Bucks be chain'd in their Places, and the Does turned in. They will all live much more comfortably in this House than in the Pits; and at the Times of taking away their young, let them be put into the smaller Rooms or Closets, prepared



pared for that Purpose, where they will live and thrive very comfortably. A Building of this Kind will cost little, and the Profit arising from the Rabbits will be much greater than in any other Way, because they will breed freely throughout the Winter; and neither the old nor the young will be subject to Diseases. Both the old and the young will be, in this Manner also, defended better against Vermin than by any other Way whatsoever.

The feeding of the Rabbit is an Article of great Consequence, with Regard to its Health and Encrease, and it is less understood than most Things of the like Kind. Some feed them in a Manner entirely with wet Meat, others almost altogether with dry: now both these Methods are wrong. From what I have seen and try'd, a Mixture, or Diversity of Food, keeps them better in Health and Vigour, and occasions their breeding faster, and more successfully than any one Kind.

The dry Meat of the Rabbit is Hay, Oats, and Bran. Their moist or wet Food is fresh Herbage, or Roots, of almost any Kind, which they will eat with the greatest Eagerness, as Coleworts, Parsley, and others, from the Gardens; and Sow-thistles, Mallows, and the like, from the Fields. Now these I would advise the Husbandman to give them interchangeably; always observing this Caution, that when he gives his Rabbits dry Meat, he must set them Water; and that when they have the fresh or moist Meat, they have no Occasion for any; the Juices of those Leaves and Herbs supplying them with a sufficient Humidity.

It is a common Custom with many to cut up

the fresh Food for their Rabbits from under an Hedge, taking every kind of Herb that offers, so it be young, and the Rabbit will eat almost any; but in this some Caution is necessary, for the Herb Hemlock is very common under Hedges, and it is poisonous; the Rabbit will eat it greedily, but it dies by the Effect.

The Hay that is given to Rabbits must be the finest, sweetest, and shortest that can be got. Nor let any one grudge the Expence, for they eat but little, so that the Amount is scarce worth Consideration.

This is the best and healthiest Food of all others for Rabbits, and should be their standard Diet, but about once in five Days they should have the fresh Herbs, which cool and scour them. And by this Management they will be kept healthful and vigorous; always ready for breeding, and their young will be lusty, strong, and thriving.

Among the other Food of the Rabbit should be mentioned Grains: this is of a middle Nature between the moist and dry Food; and is a very cheap Diet; but it is not wholesome, and therefore is dearer in the End. The Rabbits will seem to thrive upon it, but there is no Food whatsoever that makes them so liable to Diseases.

In general, the Advantage of their dry Meat is, that it prevents Diseases: and those who commonly keep them upon fresh and moist Food, as many do, giving them Carrots and other eatable Roots among it, would do well to change it for dry Meat in wet Weather: for moist Food is the great Cause of these Creatures having the Rot, and they are most of all subject to this in damp Seasons.

## B O O K V. P A R T II.

### O F F O W L S.

#### C H A P. XXVIII.

##### *Of the Cock and Hen, their Kinds and Choice.*

WE come now to the Consideration of Animals of smaller Size, and less Advantage than those several capital Articles of the Farmer's Stock treated of in the first Chapters of the preceding Book; yet not to be neglected. We are led by the Consideration of the little Animal, last named among the Beasts, to the Creatures of the winged Kind, among which we have begun not with the largest Sort, but the most useful. We have seen what considerable Profit may arise from the Rabbit well managed; and we shall see here that the Hen, when considered with respect to her Eggs and Chickens, not to mention her own Body, and the Feathers, affords an Article, though small in Comparison of some among the preceding, yet very worthy of the Farmer's careful Regard.

Though the Profits arising from the Hen and her Kind are small, in Proportion to those of the Ox or Sheep, yet they come easier. There is

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less Trouble and Expence in these Creatures, even than in the Rabbits. Indeed they in a Manner take Care of themselves; feeding at the best upon the Scatterings of the Barn, with little Assistance; and maintaining themselves even where there is not this Help, by their own Care with very little Help.

Fowls are therefore a Stock the poorest may keep, and such as the richest need not to neglect; they are universal, and they very well deserve to be so; and are a Comfort to the Peasant, while they add their Profit, though small not inconsiderable, to the general Purse of the wealthy Farmer.

The Husbandman is therefore to provide himself with Cocks and Hens as a material Part of his Stock, and he need not be afraid of overdoing in this Article; for these are not like those Creatures, Numbers of which require great Attendance, and rich Pasturage: a very considerable Quantity of these will provide for themselves in his Yard, and at the Barn Door, for the greatest Part of the Year, without doing him

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any Damage, and will be supported during the Remainder, at a very small Expence.

The Advantages they afford in Return for this are very considerable in their Kind, when the Number is large; and they are in a Manner continual: they are a constant Supply for the Provision of his Family; and as constant for the Market; where, according to their Management, they afford a larger or smaller Price.

The Value of every Thing rises in Proportion to the Demand there is for it, and on this will depend the particular Directions that are to be given to the Farmer in this Article. The great Demand for Fowls is in large Towns, therefore the careful Provider ought to proportion the Quantity of these he keeps to his Situation. If he live in a lone Place, it will not be worth his while to keep more than will serve for his own Family's Supply, and for a few of his Neighbours who may purchase of him: but if he be situated near a Market Town, especially if within a due Distance of LONDON, he may stock himself as largely as he pleases; and the greater Number the more the Profit; for there is there a constant and good Market throughout the whole Year, for one Kind or other in this Way, either Eggs, Pullets, Chickens, Capons, going off at a good Price the whole Year.

Additionally to this, which is the greater Consideration, he has the lesser Article of their Feathers; and he has also the Dung, which is very rich, as has been already shewn in its proper Place.

The Husbandman therefore by this Consideration, will be led to the fixing upon a proper Number of this Kind of Stock, and after that he is to acquaint himself with the Choice before he makes his Purchase. A great deal depends upon the first Choice in all these Cases: the whole Brood to come is to be of the same Kind with these, which are the general Parents.

The Industry and Curiosity of those who breed Poultry of this Species for their Pleasure or Profit, have of late Years greatly multiplied what are called the Breeds: but these Differences are not so great as many imagine. They arise from small Distinctions, and will sometimes go off in the Continuance. Between the Darning Fowl, and the little Bantam Breed, there are many Degrees in Bigness; and the Game Breed is altogether distinct from all these; answering the Purposes of the Sportsman, not of the Farmer.

Among the several Breeds I would advise my Husbandman to chuse, not fixing himself to one in particular according to what he supposes to be its Value above the rest, but considering which will best answer the Demand he is like to have for the Produce. In some Measure, indeed, he is to be guided in this by the Circumstances of his Farm; as in the Choice of his Oxen and Sheep, by the Richness of his Pastures. He who has a good Barn Door, and a rich Yard, will be able to keep a proper Quantity of the largest Breed of these Fowls in Health and Vigour: the common or smaller Kind will succeed best with the Peasant or the poorer Farmer, for they will support themselves by running about the Roads and Hedges, in a great

Measure; eating Insects, Seeds, and whatsoever can afford a living Creature Nourishment.

Thus upon these two Considerations of the Food and the Demand, taken together, the Husbandman, of whatsoever Rank, will be able to know which of those several Breeds that are now so common in all Places, it will be his Interest to take.

Whichsoever Kind he fixes on, let him observe these Marks of Goodness in the particular Fowls he buys, and guide himself by them in the Choice.

Let the Cock be large for his Kind, full bodied, well shaped, and lively: the Cock is naturally an upright, stately, and majestic Bird; and when he appears without these Characters, 'tis a Proof that something is amiss. The Cock that does not strut, is not fit for the Father of a Brood. He should be long in the Body, and thick in the Garth. His Neck should be long and naturally arch'd, free in its Motions, and well cover'd with Feathers. His Comb and Wattles should be large, and of a bright red; his Eyes full and sprightly, and their Colour answerable to that of his Feathers, which is a great Beauty in the Cock, and a Mark of a right and true Breed. His Beak should be strong and hooked, his Legs stout and sturdy; his Spurs long and sharp; and his Claws short and strong. These are the Marks of a good Cock, of whatsoever Breed. Some have made a great deal of the Colour, but the two best are the red and the white, of which the red is fittest for a stout breed, and the white for a more delicate.

In the Choice of the Hen, the same general Marks are to be observ'd as in the Cock, only her whole Aspect should be mild as the Cocks is sturdy. She should be lively and well colour'd; her Claws short and strong; but if she want the hinder Claws, it is so much the better. They often breaking the Eggs in her sitting.

When the Cocks and Hens are thus chosen, let them be well observ'd as soon as they are put into the Ground, for if any Thing be amiss in them, that is the Time to change; and it is much better to sell the bad again, and buy others, than to sit down content with such as are not of the best Kinds in every Respect; the Loss attending this can be little, and is for once; but the Disadvantage of having a bad Kind is great and continual.

The Cock should be lively, busy and noisy: he should be often crowing; and from time to time scratching up the Ground to turn up Worms and other Food for the Hens. The Hens should be lively, but quiet; a crowing Hen is as much to be rejected as a dumb Cock: for these are found by Experience, neither to lay any Quantity of Eggs, nor to sit well.

Now if any of these Faults appear in the Fowls that are bought for the Breeders of a Stock, let such as have them be changed; and this done over and over again till such as are in every Respect right, are fixed upon.

The Proportions of the two Sexes is about one to ten: a single Cock will serve twelve or fourteen Hens; but the most profitable Way is to allow a Cock to every ten of them; and this